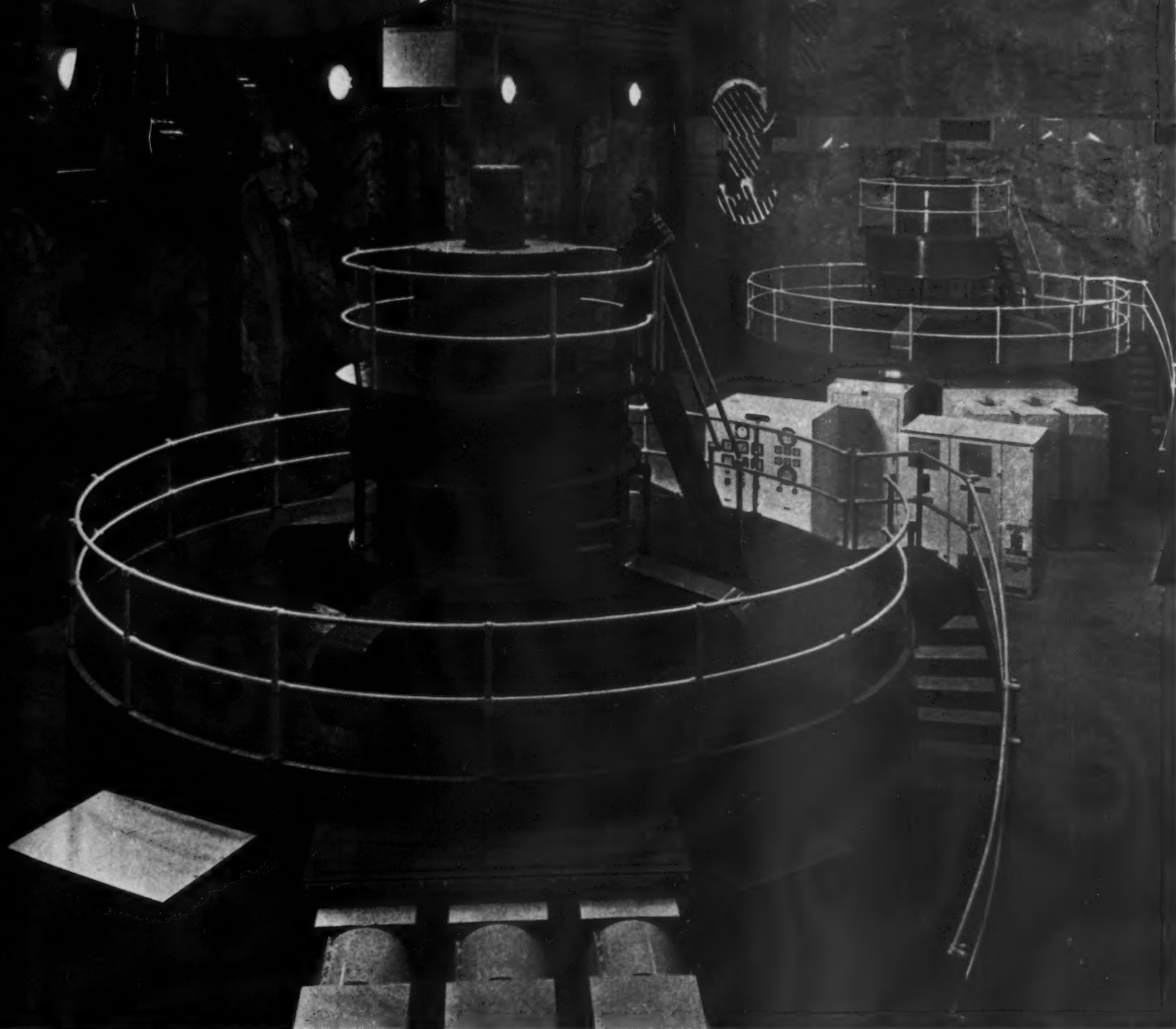


western industry



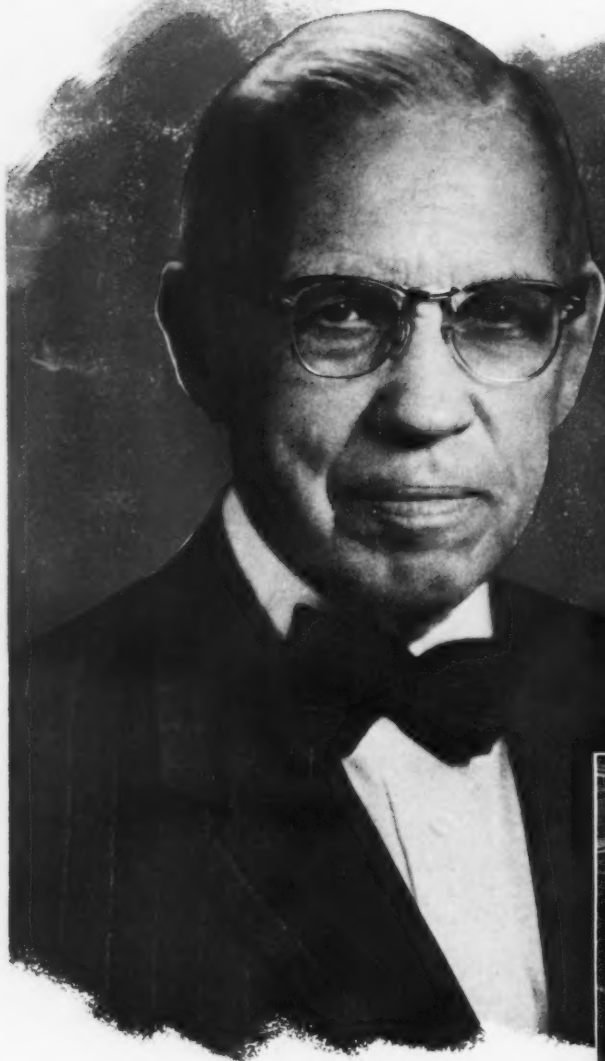
Underground power plant provides power for growing Western industrial needs. See page 29.



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STANDARD ENGINEER'S REPORT



Rocket parts meet rigid testing with Chevron Cutting Oil

In machining parts for today's rocket motors, exacting precision is required to meet very rigid specifications.

Government inspectors give a microscopic examination to every fitting turned out by the Boudreau Machine Co., Modesto, California.

The metal used is extremely hard—#321 stainless—and a superior cutting oil is necessary to keep the cutting tools from wearing. Seven years ago, Mr. Boudreau, Company Presi-

dent, found such an oil when he switched his plant to Chevron Cutting Oil 33DA.

Since then, tool life has increased and rejects have been reduced. Mr. Boudreau reports, "Chevron Cutting Oil 33DA has saved us hundreds of dollars . . . has eliminated work discoloration and gumming of ways and slides on tool drilling machines."

Equipment note: Part forming is done at 150 FPM with drilling and tapping at 25 FPM.

Lubrication problems? Let a technically qualified Standard Engineer solve them for you. His practical experience and the wide range of top quality Standard products assure an economical solution to your lubrication problem.

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SERVES THE THIRTEEN WESTERN STATES

SPECIAL REPORT	29	<i>Power and power transmission</i>
	64	<i>Special manuals on valves and fittings</i>
QUALITY CONTROL	39	<i>New ways to use x-rays</i>
PACKAGING	42	<i>Reusable packaging can save money</i>
MAINTENANCE	44	<i>Plant roofing method saves labor, costs less</i>
MATERIAL HANDLING	46	<i>Clever handling idea aids production</i>
PRODUCTION	47	<i>Odd lot automation with one machine tool</i>
MANAGEMENT	52	<i>Wescon in 1960</i>

COVER PHOTO

BUILT UNDERGROUND by Pacific Gas & Electric Co. is the Haas Powerhouse, located on the North Fork of Kings River. Note rock walls in picture. Installation is approximately two years old and is only one of a number of Western power plants recently built. Plant has 128,000 kilowatt capacity. For story see Power and Power Transmission Report, page 29.

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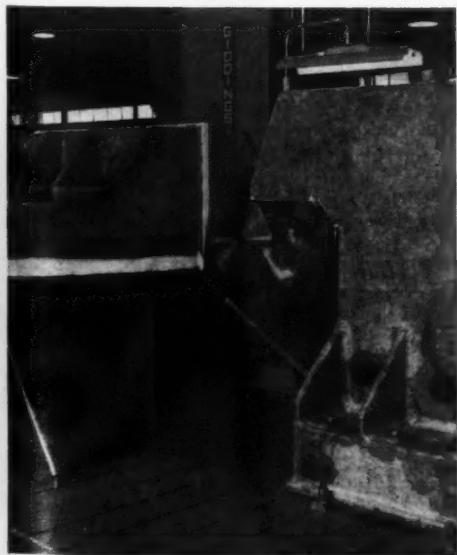
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◀ This National Supply workman is setting up a facing operation on slag pot stands produced at Torrance. Stands weigh 17,000 lbs. and 22,000 lbs.



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Specify a modern Dick Drive. They offer advantages in nearly every HP rating . . . are unsurpassed for economy and quiet, maintenance-free operation year after year — the practical choice for building quality and salability into your products.



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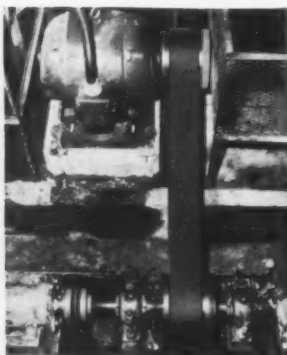


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Provides positive, non-slip transmission of power with freedom from noise, need for lubrication. Constant angular velocity. Made in range from sub-fractional HP to heavy-duty drives of 600 HP and more.

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Money-Saving... DICK FLAT BELT DRIVE



Dick developments such as rugged, stretch-free Dixylon belting bring the flat belt drive back into its own as a money-saving choice for many varied applications.

75 H.P. compressor drive for eastern paper mill. Untouched photo clearly demonstrates Dixylon's ability to perform efficiently under adverse conditions created by oil and grit.

DICK "QD" TAPERED HUB

Standard on Dick Pulleys and V-Belt Sheaves . . . provides for fast installation and tight positive fit even when slight variations in shaft diameter are present . . . gives inventory savings.



Send for Information and Literature...
Ask About Dick Components
For Flat Belt Drives.

BARRY "QD" CONVEYOR PULLEYS

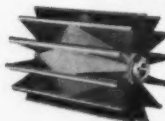
Heavy gauge electrowelded steel construction, seals out dirt and moisture for continuous service year after year. Wider faces are reinforced with extra disks.

"QD" hubs offer quick installation and positive grip. Forgives slight variations in shaft diameter.

Ask for your copy of the new load rating tables on conveyor pulleys.



BARRY "QD" WING PULLEYS



Nothing can stay between pulley and belting to cause chemical or abrasive damage. Reduced belt-to-pulley contact area increases belt life by reducing abrasion.

"QD" hubs provide quick installation and positive grip. Removes element of chance in mounting.

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Dick belting developments open the way for new freedom from maintenance and breakdown, new efficiency and durability, in machines of nearly every type and size from FHP appliances to heavy duty industrial machinery. Keep up to date by specifying the latest advances in belting from Dick.

"Dixylon-Suplex" REVOLUTIONARY SYNTHETIC FLAT BELTING



MADE ENDLESS IN MINUTES ON YOUR MACHINES WITHOUT SEWING OR LACING — a money-saving plus value of Dixylon and Suplex belting.

For heavy and light power transmission with less maintenance and downtime.

Dixylon's high strength, stretch-free construction offers amazingly high speeds without slipping. No time lost in "takeup" or belt dressing a tough, non-absorbent grease-resistant material may be joined on the job.

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DIXLINK®... Cost-Saving Detachable V-Belt



New Dixlink belting can be fitted to drives, and worn sections replaced in three or four minutes.

Supplied in reels, Dixlink V-Belts can be quickly fitted to drives of any length... reduce installation costs, simplify drive designs, are speedily adjusted for load balancing in multiple belt drives, give inventory savings, other advantages. Made in sizes covering the O, A, B, C and D V-Belt range, and also available in oil-, heat- and fire-resisting properties.

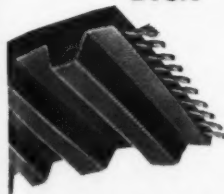
DICKROPE SUPER V-BELT and DICK HI-TORQUE WEDGE BELTS



Cross-section of Dickrope V-Belt showing 1) stress section; 2) tempered synthetic tensile cords; 3) crushproof compression section; 4) elastic-weave jacket.

The belts that are changing multiple drive design concepts; they provide for more power per belt, minimized stretch, increased resistance to abrasion and shock, added flexibility. With them, fewer belts are required, sheaves can be smaller, the drive more compact. Available in a complete range of stock sizes to meet your drive requirements.

DICK "TIMING" BELTS



Cross-section of 1 1/4" pitch Dick "Timing" Belt showing steel cable tension members. The belting is nylon faced, and has molded neoprene "teeth".

Major advantages of metal gear drives, plus quiet, practically friction-free operation, are offered by Dick "Timing" Belts. Available from stock in a complete size range with a pitch ranging from 1/3" (extra light duty) to 1 1/4" (double extra heavy duty)—with or without matching "QD" Timing Belt Pulleys.



New Star... DICK TORQUE WEDGE BELT DRIVES



Dick Torque Wedge Belt Sections

The newest development in high efficiency, space saving, multiple belt drives... the drive of the future now being pioneered by Dick. The modified "pie-slice" design of Dick Torque Wedge Belts improves power transmission, provides for simpler, smaller, more economical drives.

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Size Range To Meet Practically
Every Requirement**

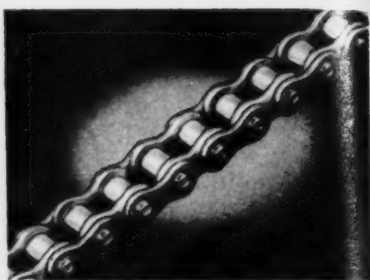
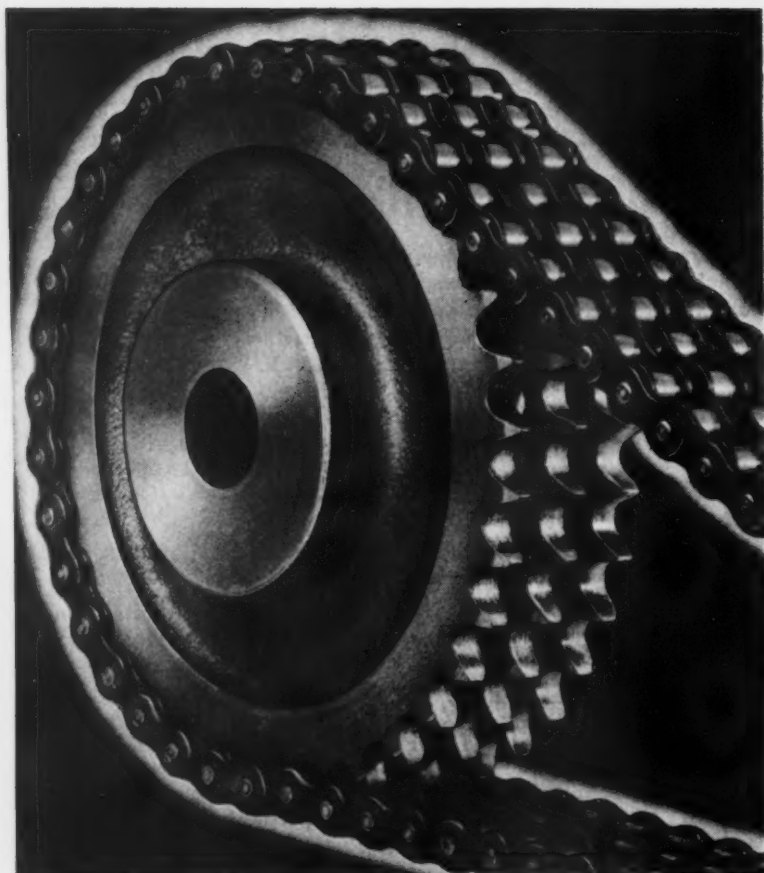
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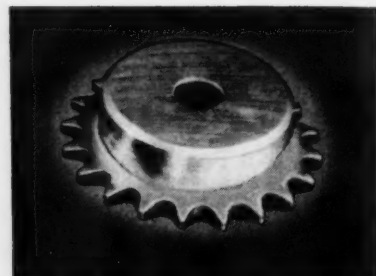
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ATLAS ROLLER CHAIN

Available in all sizes from tiny timers to big tough multiple chain drives. Regular or heavy duty . . . standard or extended pitch . . . steel, stainless steel, bronze, or electrolized.



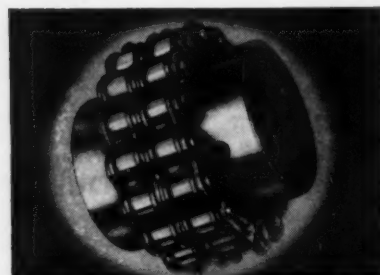
ATLAS Balanced SPROCKETS

Precision made to exact chain fit. Available in all sizes $\frac{3}{8}$ " pitch to 2" . . . steel, stainless steel, bronze.

Atlas Power Team FOR MORE EFFICIENCY ON EVERY DRIVE

There's an Atlas chain, sprocket and flexible coupling to meet your most exacting power transmission requirements. Together they are an unsurpassed team for getting the most efficiency out of your drives.

Atlas Chains have the finest quality built into every link, are pre-tested to give better service, have been performance-proved on every type of drive. Atlas Roller Chain, Sprockets and Flexible Couplings are precision matched to operate at peak performance on every installation. They are made to run quieter, last longer and require less maintenance. Team up your drives with this **power team** for longer life and lower operating costs.



ATLAS FLEXIBLE COUPLINGS

Quiet running, ruggedly built for every drive. Available from stock—bore $\frac{7}{16}$ " to $3\text{--}9/16$ ". From fractional to 254 H.P. range.

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saturated

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Richfield is the first and only West Coast oil company to produce high quality benzene for sale to the chemical industry. That's because, at Richfield, progress never reaches a saturation point.

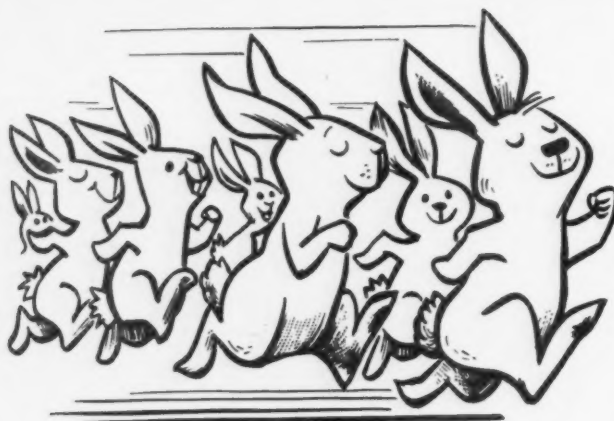
Extremely high purity raw materials for the chemical industry.

RICHFIELD OIL CORPORATION / CHEMICALS DEPARTMENT

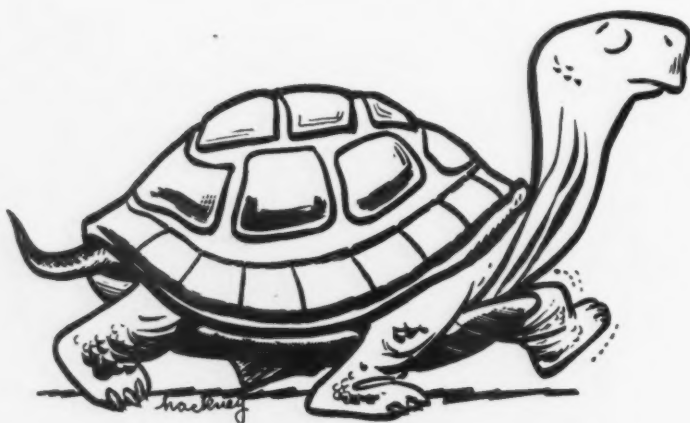
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We are mechanized for large volume, high production casting and forging. At the same time we have the skilled personnel and equipment to handle the single specialized job.

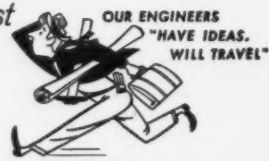
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New and Revolutionary... SLING CHAINS THAT TALK

The **WARNING RING** on Campbell **SENTRY SLINGS*** tells you immediately when the sling has been overloaded . . . it elongates visibly . . . and before the chain itself is damaged.

Your eye can see the difference!

Ring remains round
Sling used properly

Ring distorted
Sling overloaded

New, revolutionary . . . Campbell **SENTRY SLINGS**—fully tested for over a year by foundries, steel fabricators and heavy equipment manufacturers, offer many important advantages. The **WARNING RING** is stronger than the chain itself. Yet it changes shape as the sling is overloaded . . . *before permanent damage occurs*. Repair is quick and easy, with a new **WARNING RING** replaced at the factory. Re-tested and re-certified Sentry Slings are again ready for regular service.

Here's How You Benefit From New SENTRY SLINGS:

- Safety programs are easier to maintain—with the **WARNING RING's** built-in safety that protects men and material!
- Lower repair costs give larger savings than ever—normally only the **WARNING RING** will need repair!
- Immediate visual evidence of overload means easier inspection—even while sling is in use!

SENTRY SLINGS, available in all types, are made from Cam-Alloy steel chain only and are available at no extra cost! All slings carry the Campbell Guarantee and Certificate of Test.



CAMPBELL CHAIN Company

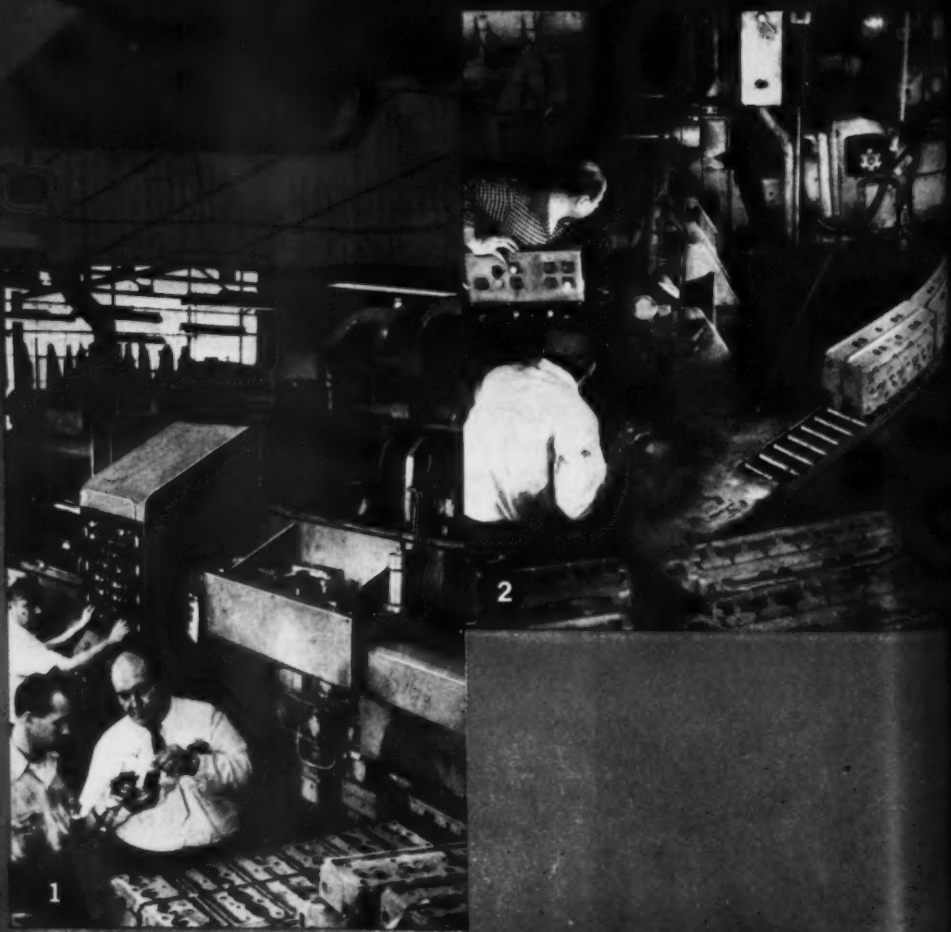
FACTORIES: York, Pa.; West Burlington, Iowa; Union City, Calif. WAREHOUSES: East Cambridge, Mass.; Atlanta, Ga.; Dallas, Texas; Chicago, Ill.; Portland, Ore.; Seattle, Wash.; Los Angeles, Calif.

*Patent Applied For

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MOBIL
HELPS

American Motors set



"The popular demand for Rambler Automobiles has resulted in sharply increased production requirements for our division. To keep our equipment running at capacity we have worked closely with Mobil Oil Company. This effort has been completely justified and has saved us considerable money."

MR. R. E. ANDERSON, *Superintendent,
Motor Division, American Motors Corp.*



t production records!

**American Motors Plant at Kenosha, Wisconsin,
fills increased production demands...reduces
downtime...cuts labor and material costs!**

Keep 'em coming! That's the order of the day for Rambler Automobiles, and production stoppages can be disastrous. When American Motors' far-sighted management anticipated production demands that would greatly exceed rated plant capacity, they promptly went about making preparations. Mobil was called in to insure correct lubrication for the highly critical production machinery in the motor division.

Mobil engineers, working in close cooperation with American Motors personnel, analyzed the lubrication problems posed by this record output...studied other problem areas as well. They recommended correct heavy-duty products, effective preventive maintenance procedures, techniques to reduce contamination and prolong lubricant life. As a result, machine downtime was greatly reduced, production availability sharply increased, and direct dollar savings to American Motors were achieved.

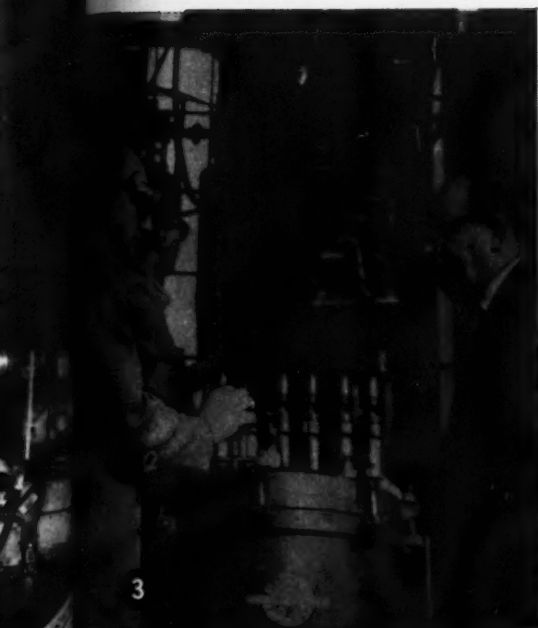
If you are interested in how Mobil may help you solve lubrication problems in your plant, call your nearest Mobil representative. Or write: Mobil Oil Company, 150 East 42nd Street, New York 17, New York.



CORRECT LUBRICATION

MOBIL OIL COMPANY, 150 East 42nd Street, New York 17, N. Y.

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3

1. An annual change of hydraulic oil was once the rule for this large machine which reaches top and bottom of cylinder heads. Mobil engineers felt oil usage could be reduced, performed periodic analyses that showed oil could be used three years. Examining oil sample is Anthony Belasich, Assistant Superintendent.

2. This "transfer line" machines cylinder heads. Subsequent washing operations were hampered by excessive "soaping" of the cleaner. Mobil traced the trouble to the cutting oil then in use...recommended an equally effective, but less costly product that solved the problem.

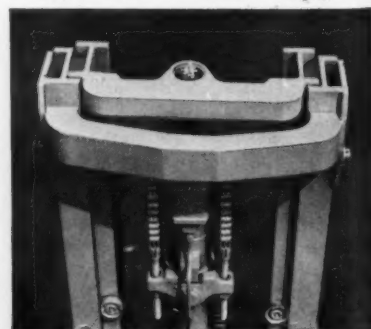
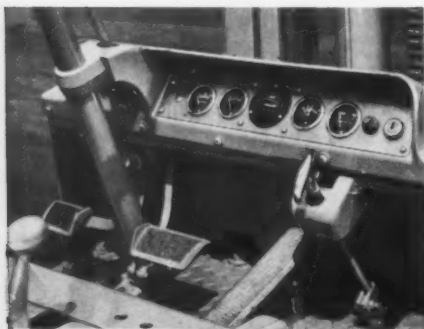
3. To meet production schedules, American Motors runs its engine division 24 hours a day at full capacity. Overload caused frequent breakdowns on the critical transfer machines that drill and ream cylinder blocks. Mobil recommended a correct heavy-duty lubricant, suggested periodic storing of lubricant and hydraulic oil. Stoppages were drastically reduced. Discussing filtering procedure are Rudy Metzger, Assistant Superintendent and Frank Turner, Mobil Representative.



Fast, safe operation • centrally located controls • protected instrument panel • separated ignition key and starter switch • reinforced steering column bracket • automotive type inching, brake pedals.

Low seating position on G54 speeds trailer loading and increases safety. Seating height of 37" and overall height of 71" affords the driver plenty of head-room for safer operation.

Double I-beam on mast affords greater strength and stability, and less deflection. Exclusive side thrust rollers for mast and carriage assure frictionless lifting action at all times.



YALE OFFERS: FIRST COMPACT GAS LIFT TRUCKS

- Solid or pneumatic-tired • 3000, 4000, 5000 lb. capacity • Gasoline or LP-Gas powered • 52 HP engine in solid-tired model, 72 HP engine in pneumatic-tired model • New, improved automatic torque transmission.

You get compactness and speed for faster, safer operation cycle from the Yale G54 series gas trucks. Lifting is a job the Yale Compact does fast . . . from 75 to 80 FPM. Its controlled lowering speed ranges from 55 to 80 FPM. You have full lifting speed at all times, plus increased pump life, assured by the patented super-charged hydraulic tank. You easily adjust the exclusive mechanical inching control to your individual operational requirements. What's more, Yale Compact offers you greater safety, with self-energizing, self-adjusting brakes and wheels. Operation is easier and more efficient. You operate all hydraulic attachments of the Yale Compact with only one exclusive, multi-function control handle.

Safe ride and shock reduction, better stability, and a self-righting effect come from Yale's new steering axle design. Steering axle mounts on two 2" diameter articulating pins.



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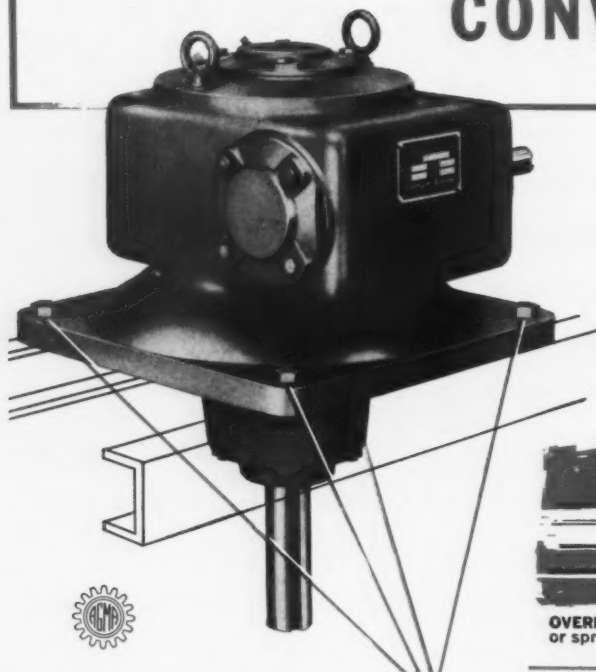
INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS • HOISTS

YALE & TOWNE

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FAST off-the-shelf delivery

MORSE EBERHARDT-DENVER CONVEYOR DRIVES



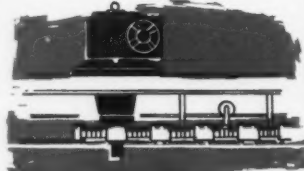
★ No design limitation . . . up, down, or 90° mounting
★ one-piece alloy cast iron housing ★ high torque capacity
★ single or double reduction gears ★ input ratings from .12 hp to 53.72 hp using double worm reduction or helical worm reduction ★ ratios from 5:1 up to 3600:1—from stock at low factory prices.

Easy-mount design... only 4 bolts

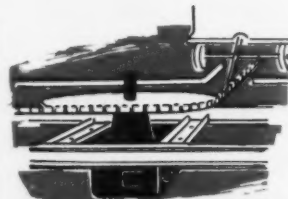
Morse E-D speed reducers lead in limitless applications with utmost ease in mounting. The 4 holes form a perfect square concentric to the output shaft. Unlike most designs, Morse E-D speed reducers feature oversize bearings on wide centers . . . resulting in an overhung load capacity at the end of the output shaft equal to the torque capacity.

Mounting versatility with the unit's cast-in base makes Morse drives adaptable to conveyors of all types, agitators, screw conveyors, machines, and for any other transmission of power where dependable speed reduction is specified.

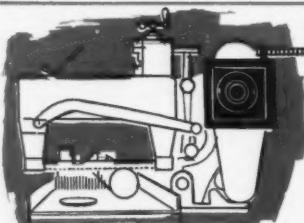
You'll find Morse "standard" drives ready for immediate delivery . . . often eliminate the problems of "specials." Check with your Morse distributor, he's listed in the Yellow Pages under "Power Transmission," or write Morse Chain Company, Dept. 32-90, Ithaca, N. Y. for illustrated catalogs. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.



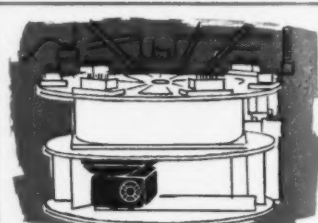
OVERHEAD . . . typical caterpillar or sprocket drives



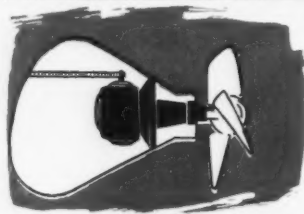
SUB-FLOOR . . . for towline or special equipment



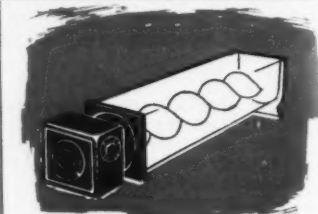
90° MOUNTING . . . for heavy-duty metal saws and machines



VERTICAL . . . base mounting for power turntable machines



SIDE MOUNTED . . . paint, pulp, liquid, or chemical agitators



HORIZONTAL . . . screw conveyors, straight or angular mounts . . . and scores of standard or special uses.

MORSE **BW**

T. M.

A BORG-WARNER INDUSTRY

. . . for more details, circle No. 12 on Reader Service Postcard
WESTERN INDUSTRY/SEPTEMBER 1960

western
industry



western meetings

Tool & Manufacturing Engineers Discuss Western Show Plans



ATTENDING a California Council meeting in San Francisco recently to discuss plans for the American Society of Tool and Manufacturing Engineers Western Engineering Conference & Exhibit at the Los Angeles Memorial Sports Arena November 14 to 18 are, left to right, front row: Rudolf Regen, Host Committee Chairman, General Machine Works, L. A.; Jack Lowry, McClellan Air Force Base; Robert Edgcomb, Edgcomb Engrg. & Engraving Co., Burbank; Robert Frazee, Applied Research Laboratories, Inc., Glendale; and L. Dean Roulund, General Grinding, Inc., Oakland. Upper row, left to right: Ralph Garcia, De Castro & Assoc., Montebello; William Forbes, Montague Harris & Co., San Francisco; Frank Gonzales, Royal Grinding Corp., Los Angeles; and Art Dzigorski, Aerojet General Corp., Sacramento.

Westerners Active In Forming New National Association

A NEW NATIONAL ASSOCIATION, the Mechanical Power Transmission Equipment Distributors Association, has recently been formed. The organization is holding its first Convention on October 6-8 at the Hotel Sherman, Chicago, Ill.

Four Westerners have been active in the formation of this association and are currently serving as National Directors. They are K. D. Adam, Adam-Hill Co., 142 Utah Ave., South San Francisco, Calif.; Martin Borgford, Bearing Sales & Service Co., 2908 Sixth Ave. South, Seattle, Washington; Harlan McKay, Harlan C. McKay Co., 1901 N. W. 26th Ave., Portland, Oregon; S. M. Weiser, Union Bearing & Transmission Co., 1635 Blake, Denver, Colorado.

Of interest to Western power transmission distributors

and manufacturers is the fact that an active membership drive is now going on in the Western states. Those interested in joining the organization may write any of the men listed above.

Material Handling Institute Pacific Coast Show

A CHANGE has been made in show hours to accommodate visitors to The Material Handling Institute Pacific Coast Show. This regional trade show featuring material handling and protective packaging products occupies the Cow Palace in San Francisco from February 22 through 24, 1961.

Replacing a mid-morning opening, doors will open to visitors at 11:00 A.M. on all three days. On Wednesday and Thursday, February 22 and 23, this show will welcome visitors until 9:00 P.M. On closing day, February 24, exhibit hours end at 5:00 P.M.

R. F. Moody, chairman of the show committee of The Material Handling Institute, Inc., accompanied the new hours announcement with this comment: "The MHI Pacific Coast Show was created to serve the industrial buyer with convenience. The regional event brings the products directly into his region. He does not have to travel to Chicago or Cleveland to see what's new in material handling. The shorter morning hours, and more evening hours, is a definite convenience to men in Western industries. Buyers and their associates can take morning planes into San Francisco from such cities as Los Angeles, Portland, Denver, Tucson, or Salt Lake City. Within a few hours they can inspect the more than 220 exhibit booths in the Cow Palace, and fly back to their homes that evening."

Western Welding Show Scheduled For Oct. 13-15 in San Jose

THE THIRD American Welding Society Western Welding Show in San Jose, California, at the Santa Clara County Fair Grounds, is scheduled for October 13-15. It will be held in conjunction with the Western Welding Technical Conference at the St. Claire Hotel in San Jose. The show is expected to draw representatives interested in metal-working from every Western state.

Show hours are: Thursday, October 13, 2:00 to 10:00 p.m.; Friday, October 14, 10:00 a.m. to 10:00 p.m.; Saturday, October 15, 10:00 a.m. to 4:00 p.m. Some 26 firms have already contracted for space.

The Welding Technical Conference will open with registration at 8:00 a.m., Thursday, October 13. During the first day papers presented will include Welding on Stainless Steel, Nickel Alloys, and Welding Alloys. October 14 discussions include Welding Alloys for High Temperature Service and Welding and Brazing in the Electronic Industry. Saturday, October 15, concludes the Technical Conference with a half-day session on Welding of Aluminum.

Registration for the Conference is \$10.00 for the series, or \$5.00 for each half-day attendance. Conference chairman is J. W. Turner, Pacific Metals Company. Assisting him are W. R. Smith, General Electric Co.; W. J. Erichsen, Western Electric Corp.; R. C. Bergossa, Pyromet Co.; R. H. Rhoades, Sylvania Products, Inc.; A. M. Hubbard, General Electric.

(Continued on page 27)

DODGE HAS MORE PROVED BEARINGS THAN YOU HAVE BEARING PROBLEMS!

It pays to buy from a line of stock bearings—bearings that have been proved in thousands of installations similar to yours. You benefit by getting known dependability; and you get the important savings of high quality at production price.

PIN-POINT SELECTIVITY

Dodge has supplied mounted bearings to industry for over three-quarters of a century. Dodge bearings have always kept pace with improved production practices. Each new condition of service has been met by Dodge as it has arisen, with the result that the Dodge line contains mounted bearings to meet almost every service requirement with pin-point accuracy.

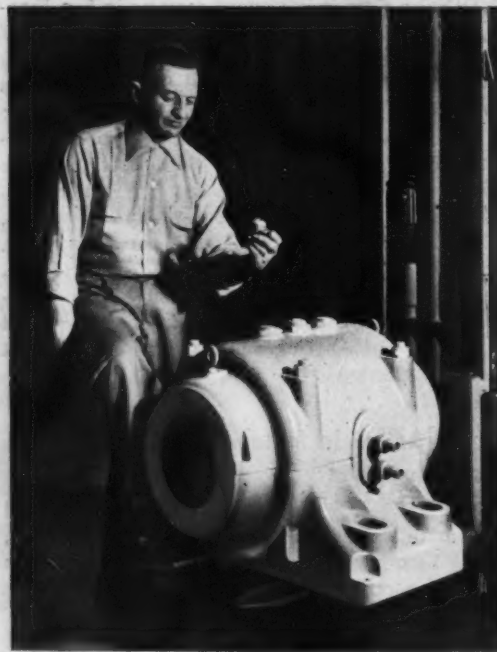
High load, high speed, excessive dust, moisture, corrosion, high or low temperatures, continuous operation—you name it!—such conditions and their combinations are met every day with Dodge bearings.

BROAD LINE—WIDELY DISTRIBUTED

In the great variety of mounted bearings developed by Dodge, you will most likely find the precise unit to fit your requirements ideally—without paying for features you do not need. And if your requirements call for several types of bearings, there is an advantage in having them of common design, such as Dodge offers.

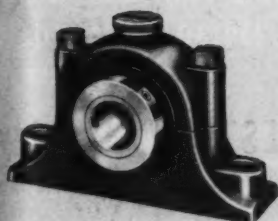
The Dodge line is probably broader than any other line of mounted bearings in America. And of special importance to machinery manufacturers, it is the most widely distributed line. There is always a Dodge bearing of the right type and size near at hand.

You can check this with your local Dodge Distributor. Ask him—or write us for the Dodge Bearing Bulletin.

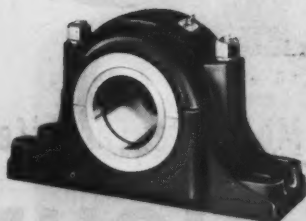


In addition to tapered roller, spherical roller and ball bearings, Dodge builds many types of sleeve bearings. Here is the "large and small" of the sleeve type bearings carried in stock—ranging from an 8-in. Sleeve weighing over 1200 lbs. to a 1/2-in. solid journal bearing weighing 9 ounces.

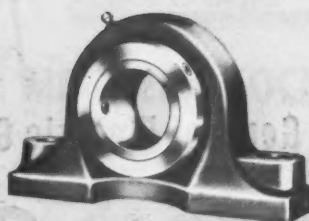
DODGE MANUFACTURING CORPORATION, 6600 Union Street, Mishawaka, Indiana



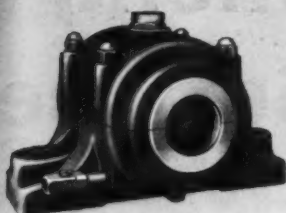
**DODGE PILLOW BLOCKS WITH
TIMKEN TAPERED ROLLER BEARINGS**



**DODGE SPHER-ALIGN PILLOW BLOCKS
WITH SPHERICAL ROLLER BEARINGS**



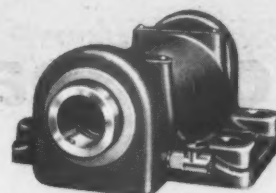
**DODGE BALL BEARING
PILLOW BLOCKS**



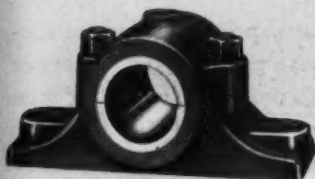
**DODGE SLEEVOIL
PILLOW BLOCKS**



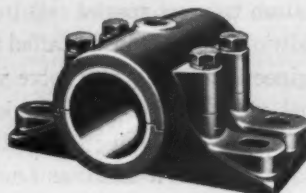
**DODGE BRONZOIL
PILLOW BLOCKS**



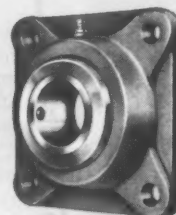
**DODGE BRONZE BUSHED
PILLOW BLOCKS**



**DODGE JOURNAL BEARINGS
SOLID AND SPLIT**



**DODGE HEAVY RIGID
PILLOW BLOCKS**



**FLANGE BEARINGS: HANGER
BEARINGS: BEARING UNITS:
TAKE-UPS**

● **Dodge Pillow Blocks with Timken Tapered Roller Bearings.** America's quality pillow blocks. Assembled, lubricated, adjusted and sealed at the factory. 5 types for varying needs.

● **Dodge Spher-Align with Spherical Roller Bearings.** Rugged heavy duty, compact, inherently self-aligning. Exclusive Micro-Mount simplifies installation.

● **Dodge Ball Bearing Pillow Blocks.** Deep groove ball bearings with long inner races—high capacity. SL, SC and SCM models for light, normal and medium service respectively.

● **Dodge Sleeveoil Pillow Blocks.** Ultra quality . . . extra long life . . . accessibility . . . quiet. Plain or water-cooled.

● **Dodge Bronzoil Pillow Blocks.** Efficient, low cost pillow blocks with self-oiling, capillary bronze bushings. Self-aligning. Large oil reservoirs.

● **Dodge Bronze Bushed Pillow Blocks.** Quiet fan and blower pillow blocks with two bronze bushings of high lead content mounted in one cast iron housing.

● **Dodge Journal Bearings—Solid and Split.** True running, dependable. Babbitted bearings with precision machined bores and faces. Finished bases.

● **Dodge Heavy Rigid Pillow Blocks.** Rugged, carefully bored, babbitted pillow blocks for many applications requiring grease lubrication. Finished bases and ends.

● **Bearing Units.** A wide variety—spherical seat, cartridge, flange, hanger, screw conveyor hanger, take-up. Ball, Roller and Sleeve types.



CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneers" in the white pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

DODGE
of Mishawaka, Ind.

. . . for more details, circle No. 13 on Reader Service Postcard



New General Electric Gear Motor Center Offers WESTERN Industry

24-HOUR Gear-motor Shipment, Modification and Service

General Electric's new Gear Motor Center for mechanical power transmission products is now in full operation at San Francisco.

Serving 11 states, the facility assures western industry of ample stocks of drives and parts, expert modification—and 24-hour repair service. Popular ratings of gear-motors, speed reducers and mechanical adjustable-speed drives are on hand for immediate shipment or for modification to meet special requirements.

In addition, the Center is staffed to handle application and installation engineering to help you solve your drive problems. Order service personnel process your order quickly. General Electric after-sales service helps protect you from costly down time.

Additional western facilities backing up the Gear Motor Center are G.E.'s nine Apparatus Service Shops, 90 Electric Motor Service Stations, as well as sales offices staffed with technical personnel in all major cities.

851-13

GENERAL  ELECTRIC



GENERAL ELECTRIC
OFFERS A COMPLETE LINE
OF LOW-SPEED DRIVES
1/8 TO 200 HP

Select from General Electric's PLUS LINE of compact mechanical power transmission equipment! A full range of ratings is available—most directly from stock.

General Electric
Polydyne II Drive

Integral-type
Gear-motor

Right-angle Shaft
Gear-motor

All-motor Gear-motor

Footed Speed Reducers

Shaft-mounted
Speed Reducers

If you have a drive problem or want information on how G.E.'s Gear Motor Center can help you, write:

G. D. Tobias
Western Sales Manager
Gear Motor & Transmission Components Dept.
General Electric Company
1098 Harrison Street
San Francisco, California

or contact your nearest G.E. Apparatus Sales Office.

GENERAL  ELECTRIC

NEW *Snap-on*



MAGNETIC SOCKETS

last ten times longer
—give re-usable
magnet bonus

Cutaway view showing socket, magnet, self-tapping screw. Snap-on magnetic sockets are available in the following sizes: 1/4-in. drive for 1/4, 3/8, 1/2, 5/8-in. sockets; 3/8-in. drive for 3/8, 1/2, 5/8, 3/4, 1-in. sockets; 1/2-in. drive for 1/2, 3/4, 1-in. sockets.

On actual customer test, this newly developed socket drove 112,320 self-tapping screws. A similar competitive socket, priced only about 30 cents less, wore out after driving only 10,530 screws. Both sockets were subjected to identical conditions.

Figure what you can save by switching to these new Snap-on sockets—in replacement cost—and in assembly line downtime, too.

and here's an Extra Bonus . . . re-use your magnets — save up to 50%

In addition to far greater life, this socket is available without the magnet. You simply tap or press the magnet out of the worn-out socket—insert it in the new one. You save 50 percent on the cost of a complete magnet socket. Snap-on has developed an inexpensive tool that inserts the magnet to exactly the right depth.

This is an example of Snap-on research and development that helps industry save time and money. Your Snap-on industrial tool specialist can show you many more. Branch offices and warehouses are conveniently located in 58 major cities throughout the U.S. and Canada.



To remove magnet, simply tap it out of the socket with an appropriate punch.



To re-insert, just tap magnet into socket with Snap-on assembly punch. The entire operation takes about a minute.

SNAP-ON TOOLS

FOR ALL INDUSTRY

8032-I 28th Avenue

Kenosha, Wisconsin

. . . for more details, circle No. 15 on Reader Service Postcard

21

← For more details, adv. opp pg., circle No. 14 on Reader Service Postcard

LARGE STOCKS OF...

Johnson

BUSHINGS BARS BEARINGS



*Now Available on the
West Coast.*

Large stocks of quality Johnson Bronze bearings, bushings and bars are close at hand for fast delivery to you here on the West Coast.

Teamed with Johnson's close-knit distributor network are its Oakland facilities and the Los Angeles and Seattle warehouses that can meet your bearing needs for . . . General Purpose, Graphited, Electric Motor and Powdered Metal Bearings, SAE 660 Bearing Bronze Bars (13 to 105 inches long), and Aluminum Bronze Bars.

In addition, Johnson's Oakland plant is equipped to make special bronze castings and to provide fast, custom machine shop service.

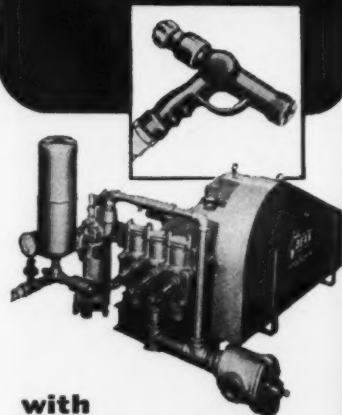
For quick service, give your local Johnson distributor a call. He will save you valuable time because he is backed up by Johnson's West Coast warehouses.

Johnson Bronze Company
Oakland 8, Cal.



... for more details, circle No. 16 on Reader Service Postcard

Reduce Washing Costs



with
**John Bean
AQUABLAST**
High Pressure
WASHERS



One man using
AQUABLAST equals a
crew of men using
ordinary water pressure!

The fast, efficient cleaning made possible by John Bean High Pressure Aquablasting is saving industry thousands of dollars annually in clean-up costs. In just seconds, the hard hitting, super-cleaning Aquablast stream cuts caked dirt, hardened cement, gummy residues, accumulated grime and dozens of other hard-to-remove substances that previously required hours of scrubbing and scraping, or strong chemicals to wash away.

SEND FOR COMPLETE INFORMATION ON 'AQUABLASTING' TODAY!

**John
BEAN**



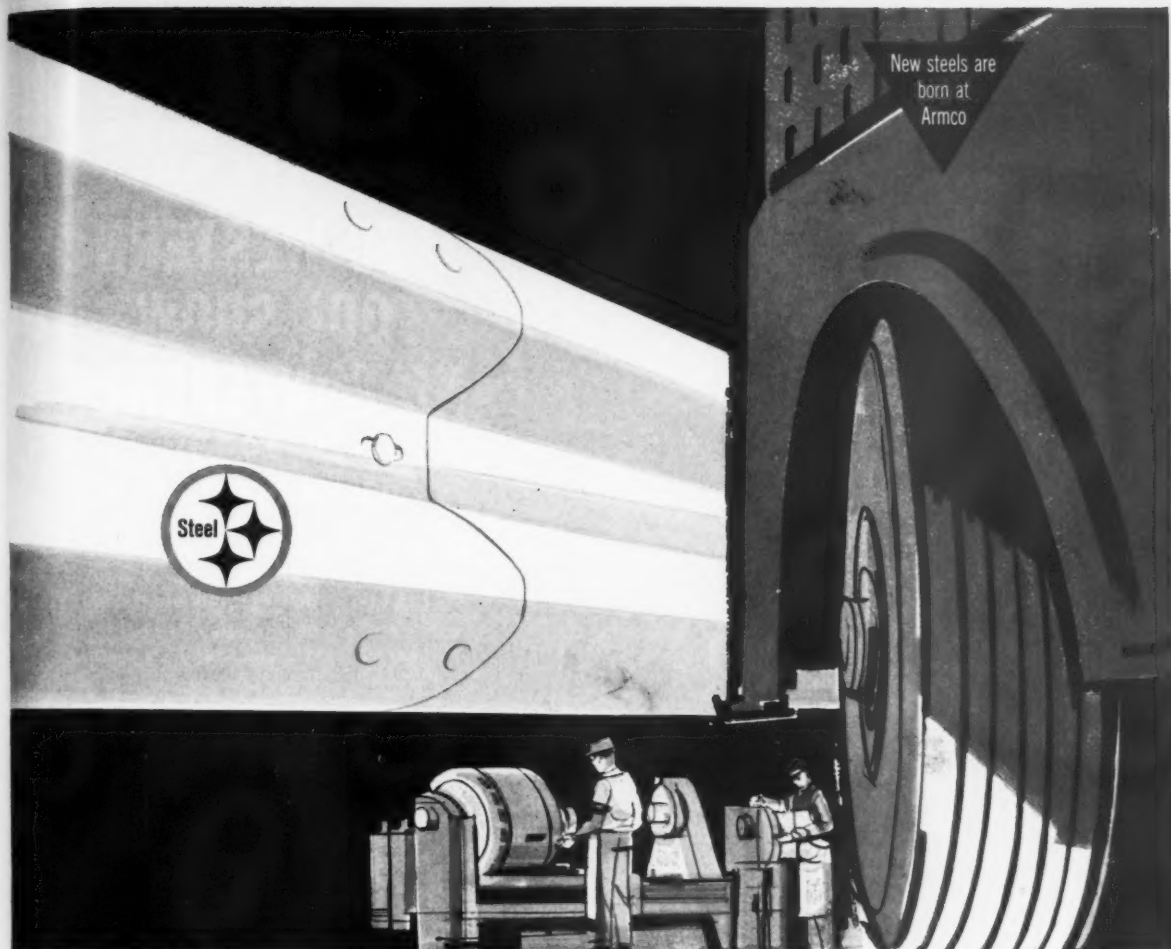
DIVISION OF
FOOD MACHINERY AND CHEMICAL CORP.
San Jose, Calif. • Lansing, Mich. • Orlando, Fla.

INDUSTRIAL PUMPS

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... for more details, circle No. 17

WESTERN INDUSTRY/SEPTEMBER 1960



ANNOUNCING A NEW GUARDRAIL MADE ESPECIALLY FOR YOUR PLANT TRAFFIC

New Light-Gage Armco Guardrail Is Easier to Handle, Easier to Install

Now you can get a special new Armco FLEX-BEAM® Guardrail for off-highway installations. Made of 16-gage galvanized steel, it weighs approximately 40 per cent less than highway-type FLEX-BEAM. The new, simplified splice requires only four bolts.

All in all, this new Armco Guardrail is lighter, easier to handle, easier to install. For the first time it provides the means for protection of plant property, parking lots,

plant entrances, expensive machines and other key equipment, with a product especially made for off-highway service. You buy less steel to do the job. It's maintenance-free, too. This new light-weight Armco FLEX-BEAM is protected from rust by a durable hot-dip zinc coating.

For full information write us. We'll arrange for the Armco Sales Engineer near you to provide the data you need. Armco Drainage & Metal Products, Inc., 2180 Milvia Street, Berkeley 4, California, or P.O. Box 751, Federal Station, Portland 7, Oregon.

ARMCO DRAINAGE & METAL PRODUCTS



Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

... for more details, circle No. 18 on Reader Service Postcard



DON'T MISS IT!

**MOST IMPORTANT INDUSTRIAL
EVENT IN THE WEST**

**1960 WESTERN
TOOL SHOW
AND CONFERENCE**

NOV. 14-18

Los Angeles Sports Arena

See the newest in metalworking
machinery, equipment, supplies and
services . . . in one hall, on one level.

Hear exciting new ideas presented,
common problems discussed by lead-
ing industrial experts.

**PLAN NOW
TO ATTEND**

Write today for
advance registration
forms to:

American Society of Tool and
Manufacturing Engineers
266 South Alexandria Avenue
Los Angeles 4, California



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WESTERN INDUSTRY/SEPTEMBER 1960



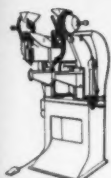
Model 423



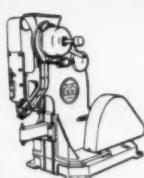
Model 250

**MILFORD'S
FLEXIBLE
RIVETER LINE
CAN HELP CUT
YOUR ASSEMBLY
COSTS**

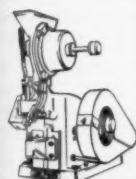
Milford adapts to your production line with a wide range of automatic riveters designed to cut assembly costs. Count on Milford's versatility to come up with answers you need at substantial cost savings over other fastening methods. Write for more information.



Model 72



Model 53



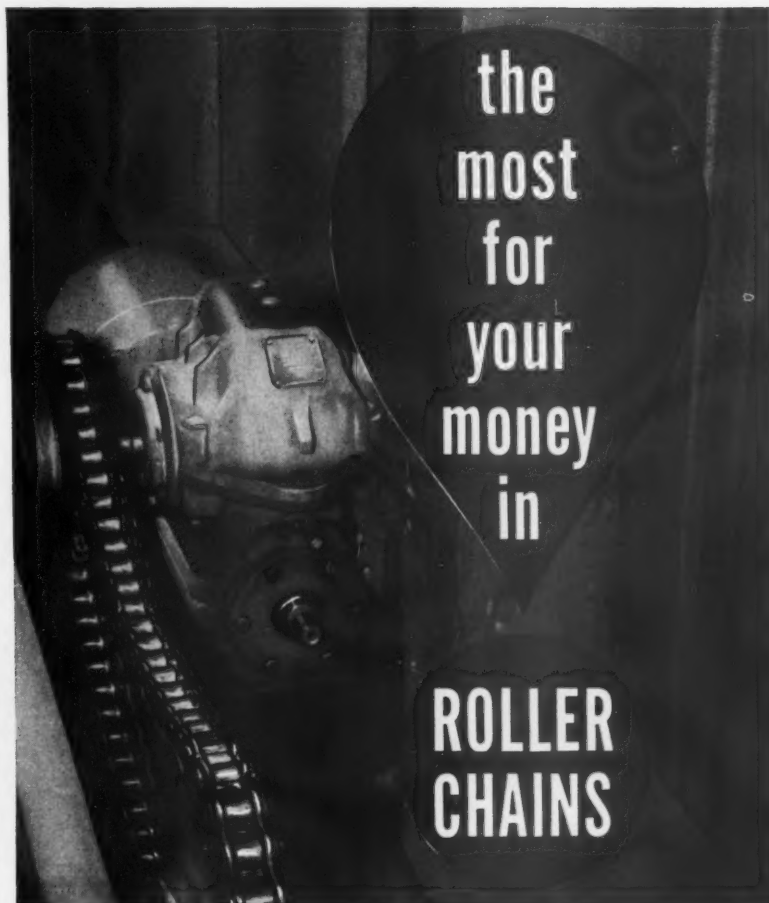
Model 52-S-55



Model 56



MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.



ACME Roller Chains are recognized as the symbol of rugged dependability and accuracy in the lumber industry. They are engineered to handle the heaviest loads under the most arduous service conditions—without friction loss or slippage.

If your requirements call for drive chains requiring glass-hard wearing surfaces, highest tensile strength and ability to stand up under the most rugged wear or high speed operations, ACME is the chain that will give you the most for your chain money. Acme roller chains are available in a complete range of sizes from $\frac{1}{4}$ " pitch to $2\frac{1}{2}$ " pitch.

Field engineering service is yours for the asking. Phone your nearest ACME distributor. He has the full cooperation of ACME's Engineering Staff.



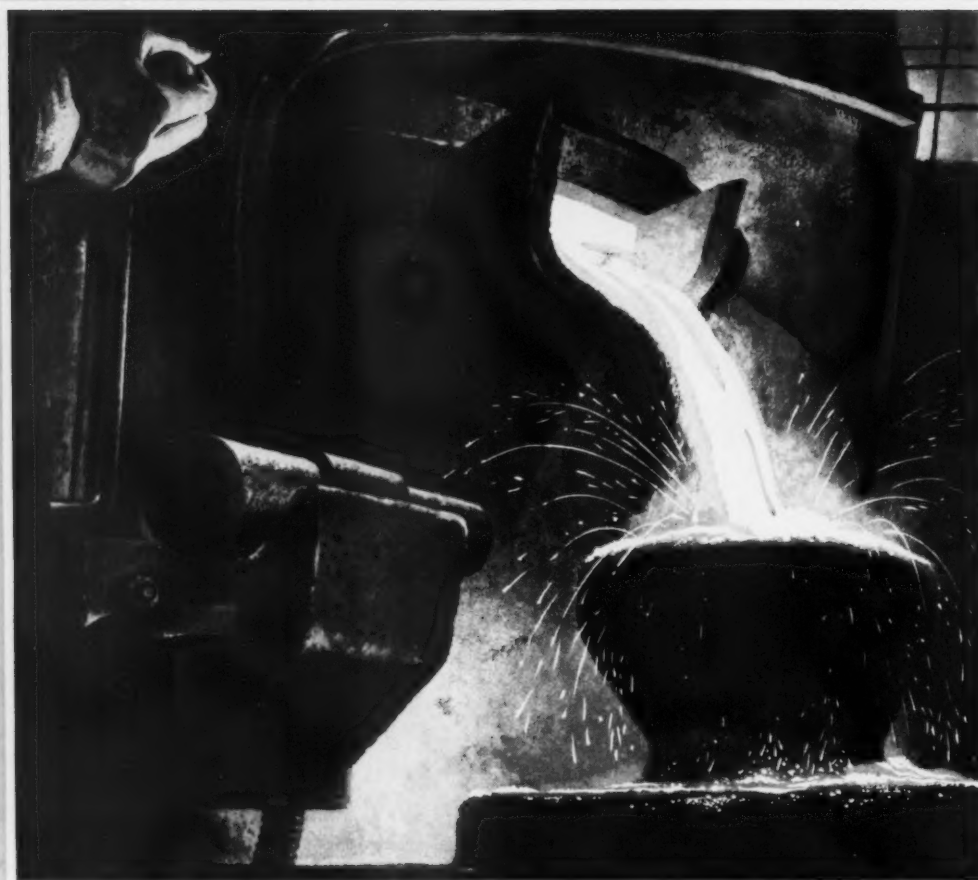
Write Dept. 2-Z
for new 100-page
illustrated technical
catalog including new
engineering section
showing 36 methods of
chain adjustments.



**COMPLETE LINE OF ROLLER CHAINS AND SPROCKETS • DOUBLE PITCH
CONVEYOR CHAINS • STAINLESS STEEL CHAINS • CABLE CHAINS •
FLEXIBLE COUPLINGS • STANDARD AND SPECIAL ATTACHMENTS**

... for more details, circle No. 20
WESTERN INDUSTRY/SEPTEMBER 1960

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Melting furnace at Calumet & Hecla, Inc.—Wolverine Division, where Shell Irus Fluid 902 eliminates the danger of hydraulic line fires.

Ready...aim... NO FIRE!

Take 10 high-temperature alloy-melting furnaces, hydraulically operated—each pouring 1500 lbs. of molten metal every hour in close proximity to “live” hydraulic lines—and you can readily see why selection of hydraulic fluids is important to Calumet & Hecla’s Wolverine Tube Division.

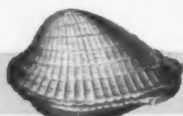
Now the operation is made more reliable by the use of Shell Irus Fluid 902, a water-in-oil emulsion type fluid. Irus® Fluid was C & H’s choice, after carefully

studying other commercial hydraulic fluids—for many reasons:

1. Irus Fluid will not support combustion.
2. Irus Fluid has excellent lubricating properties.
3. Irus Fluid has hydraulic efficiency and equipment compatibility.
4. Irus Fluid is economical, costing about one-third less than other fire-resistant fluids.
5. Irus Fluid’s bright yellow color makes it easy to spot and trace leaks.

In plant after plant, operators find that these advantages assure maximum safety to both personnel and equipment.

If you have a hydraulic line fire hazard, we suggest that you have the Shell Industrial Products Representative show you the many advantages in Irus Fluid 902; or write to Shell Oil Company, 50 W. 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Calif. In Canada: Shell Oil Company of Canada, Ltd., 505 University Ave., Toronto 2, Ontario.



AN INTERESTING FACT!
Every Shell Branded Industrial Lubricant is named for a sea shell. Shown here is the *Irus* ellipticus.

SHELL IRUS FLUID 902
the low-cost, fire-resistant hydraulic fluid



... for more details, circle No. 22 on Reader Service Postcard
WESTERN INDUSTRY/SEPTEMBER 1960

MEETINGS

(Continued from page 17)

Western Pallet Users' Conference Los Angeles, November 17-18

THE 2ND ANNUAL Western Pallet Users' Conference of the National Wooden Pallet Manufacturers Association will be held at the Statler-Hilton Hotel in Los Angeles, California, on Thursday, November 17th and Friday, November 18th, 1960. The 1st Western Pallet Users' Conference was held last year at Stanford University.

The Conference will feature talks by leading authorities on such subjects as the operation of pallet pools, purchasing and specifying wooden pallets, correct use and maintenance of pallets, inspection procedures, advantages of wooden pallet containers, and how to cut packaging costs with palletization. The purpose of the Conference is to afford all pallet users an opportunity to learn more about the technical aspects and savings involved in the procurement and application of wooden pallets and pallet containers.

The meeting is open to all present and prospective users of wooden pallets, as well as wooden pallet manufacturers and sales organizations. It affords a firsthand opportunity for participants to ask technical questions on palletization and to secure the correct answers from industry experts.

Registration Fee is \$15.00 per person, which charge includes luncheon on the first day. The program will be held in the Mission Room of the Statler-Hilton Hotel, and will run from 9:30 A.M. to about 4:00 P.M. on the first day, and from 9:30 A.M. to 12:30 P.M. on the second day. Registrations must be made in advance directly to the National Wooden Pallet Manufacturers Association, 609 Barr Building, Washington 6, D. C. Checks for Registration Fees must be made to the order of the National Wooden Pallet Manufacturers Association.

LA Chapter AMHS Hears Experts Discuss Merits of Leasing Vs. Purchase



INFORMAL PANEL SESSION on financing of equipment by lease or purchase was led by Tom Rose, right, Los Angeles Chapter tech-session chairman. Panelists from left are John Snodgrass, Union Bank; Don Edgerton, vice president, Universal Leasing Co.; and Leo McGraw, manager, C.I.T. Corp.

AN INFORMATION PACKED MEETING of the Los Angeles Chapter, American Material Handling Society was marked by impressive vacation period attendance as members heard a panel session on leasing vs. purchasing of material handling equipment and a description of a new system of handling administrative paper work.

Comparative benefits of leased and purchased fork trucks and other MH items were discussed by a panel representing both the leasing and financing industries. Answering questions from the floor on merits of purchasing equipment were John Snodgrass, Union Bank; Don Edgerton, Universal Leasing Co., and Leo G. McGraw, C.I.T. Corp., detailed advantages of leased equipment from tax and expense standpoints.

Included on the program was Ralph A. Lee, head of Accounting Data Systems, Los Angeles, who showed the new Mod-U-Matic data processing system for accounting and business records. Featured in this system are inventory reports, maintenance cost summaries, sales and operating cost analyses.

Calendar of Western Meetings

Sept. 25-30 — 2nd ANNUAL PACKAGING, PLANT LAYOUT, MATERIAL HANDLING SHORT COURSE. UCLA Conference Center, Lake Arrowhead, Calif. Write to Engineering Building, Unit II, University of California, Los Angeles 24, Calif.

Sept. 27-29—AMC PACKAGING & MATERIAL HANDLING CONFERENCE. Sacramento, California. "Progress of the Air Force-Industry Team," participation by AMA's Major Air Commands.

Sept. 30-Oct. 1—SPACE TECHNOLOGY CONFERENCE. Los Angeles Campus, University of California. University of Calif., L. A., and University of Oklahoma.

Oct. 5—REGIONAL TECHNICAL CONFERENCE, PLASTICS VS CORROSION. Mark Hopkins Hotel, San Francisco. Society of Plastic Engineers.

Oct. 6-7—CHEMICAL INDUSTRY SYMPOSIUM ON CORROSION. Sheridan-Palace, San Francisco. National Association of Corrosion Engineers.

Oct. 10-14 — NATIONAL AERONAUTIC MEETING. Ambassador Hotel, Los Angeles, Calif. Society of Automotive Engineers.

Oct. 13-15 — 3rd AWS WESTERN WELDING SHOW. Exposition Hall, Santa Clara County Fair Grounds, San Jose, Calif. Santa Clara Valley Section, American Welding Society.

Oct. 17-22 — CONVENTION OF NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS, WESTERN REGION. Stardust Hotel, Las Vegas, Nevada.

Nov. 1-4 — BUSINESS EQUIPMENT EXPOSITION. Los Angeles Memorial Sports Arena. Office Equipment Manufacturers Institute.

Nov. 14-18 — 1960 WESTERN TOOL SHOW. Sports Arena, Los Angeles, Calif. American Society of Tool and Manufacturing Engineers.

Nov. 17-18 — 2nd WESTERN PALLET USERS' CONFERENCE. Statler-Hilton Hotel, Los Angeles. National Wooden Pallet Manufacturers Association.

Dec. 12-15 — ATOMIC INDUSTRIES EXHIBITION. Masonic Auditorium, San Francisco AIF, Fairmont Hotel; ANS, Mark Hopkins Hotel, San Francisco.

Jan. 23-Feb. 2—1961 ENGINEERING & MANAGEMENT COURSE. Los Angeles Campus, University of California. Reno R. Cole, College of Engineering, U. of C., Los Angeles 24.

Feb. 1-3—2nd WINTER MILITARY ELECTRONICS CONVENTION. Biltmore Hotel, Los Angeles. National Professional Group on Military Electronics and L. A. Section, Institute of Radio Engineers.

Feb. 16-19 — INTERNATIONAL AUTOMOTIVE SERVICE INDUSTRY SHOW. Los Angeles Memorial Sports Arena. Pacific Automotive Show.

Feb. 22-24—MATERIAL HANDLING INSTITUTE PACIFIC COAST SHOW. Cow Palace, San Francisco. Material Handling Institute.

NEW FALK EQUI-POISED MOTOR MOUNT

For use with the Falk Shaft Mounted Drive

gives unequaled economies plus convenience

HOW A FALK EQUI-POISED MOTOR MOUNT REDUCES BEARING LOADS ON A DRIVEN MACHINE

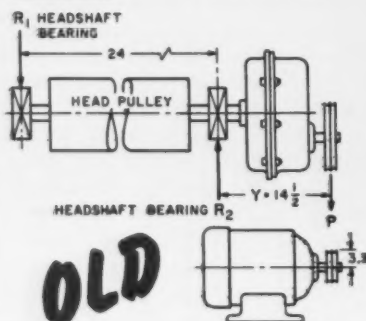
GIVEN:

Motor—15 hp, 1750 rpm, Frame 284U, Weight—320 lb.
Sheave diameters—6.6/9.4
Driven machine—belt conveyor with 24" center distance between headshaft bearings.

NOTE:

Weights of 307J24 Shaft Mounted Drive, sheaves, and V-belts are eliminated from calculations because they remain constant; do not affect the comparison.

WITHOUT FALK MOTOR MOUNT



Torque at motor shaft = $63,025 \times 15 \text{ hp} = 540 \text{ lb-in.}$
1750 rpm

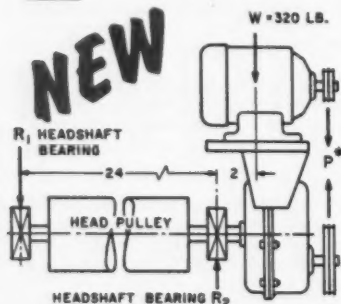
Belt pull (P) = $540 \text{ lb-in.} \times 1.5 \text{ Load Connection}$
 $\frac{3.3}{\text{Factor}}$
= 246 lb

$R_2 = \frac{246 \text{ lb} \times (24" + 14.5")}{24"} = 395 \text{ lb}$

$R_1 = \frac{246 \text{ lb} \times 14.5"}{24"} = 149 \text{ lb}$

(Check: $395 \text{ lb} - 149 \text{ lb} = 246 \text{ lb}$)

WITH FALK MOTOR MOUNT



* P = ZERO REACTION AT HEADSHAFT BEARINGS

V-belt pull has zero reaction on headshaft bearings. Therefore—

$R_2 = \frac{320 \text{ lb} \times (24" + 2")}{24"} = 347 \text{ lb}$

$R_1 = \frac{320 \text{ lb} \times 2"}{24"} = 27 \text{ lb}$

(Check: $347 \text{ lb} - 27 \text{ lb} = 320 \text{ lb}$)

Falk's new EQUI-POISED* Motor Mount is a rigid, all-steel weldment, pre-drilled for bolting standard NEMA foot-mounted motor (1/2 to 30 hp) directly to the steel frame of Falk Shaft Mounted, Flange Mounted and Screw Conveyor Drives. With it, motor can be mounted in almost any position around perimeter of reducer.

(*Balancing of forces.)

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BOB SHERMAN, Washington Belting & Rubber Co., Everett, Washington, inspects power transmission installation at Weyerhaeuser plant. Note two different types of large Dodge flexible couplings on either side of speed reducer. New disc type on driven side, at right, has been developed for heavy duty applications.

A SPECIAL

western
industry

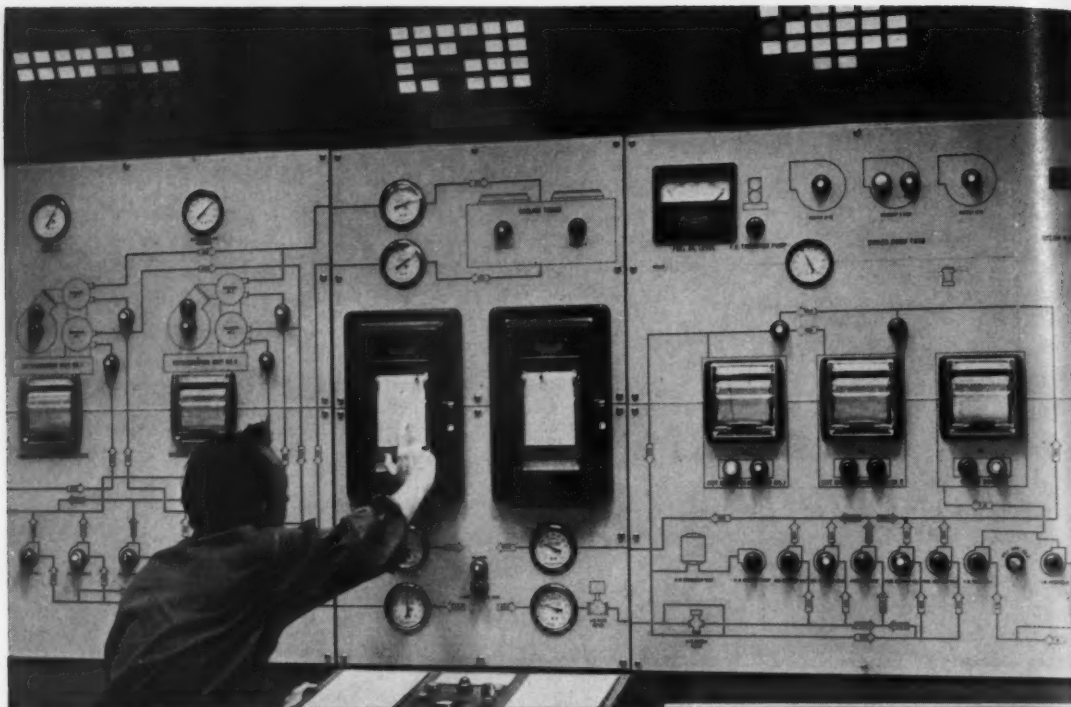
REPORT

POWER AND POWER TRANSMISSION

Watch this field. Western plants are using more power, spending more on equipment each year. At the same time new advances are proving increased costs can be reduced.

POWER AND POWER TRANSMISSION is a rapidly growing field in the West. Two trends have joined to make this area power conscious. The industrial West is expanding. New plants are being built; others are being modernized and enlarged. This means more equipment is required.

At the same time there is a definite national trend towards increased power in industry. Plants are finding that modern machines which increase production need more power to operate. As plants become more automated, conveyors and other equipment are installed, all of which increase the individual plant's



CONTROL PANEL operates heating and airconditioning system in new Bethlehem Steel building. Key to system is dial phone type control that serves as remote control for steam boiler, hot water generators, refrigeration units, cooling tower and fans. Operator can dial on or off any of these items.

need for additional power.

In the power transmission field itself we are seeing another trend. On machines using power transmission equipment there is a tendency to get away from a common power source and install individual drives and speeds for each power application.

As far as the West is concerned these trends are all affecting its industries. With Western plants generally more modern than elsewhere in the country and this area is finding its industrial power consumption rising fast. Its individual plants are spending more money than ever before on power and power transmission equipment.

POWER

Most of the plant power in the West is furnished by electricity provided by the various power companies throughout the area. Total power consumption here has increased so rapidly that Western power companies are working hard to keep up with demands. Pacific Gas and Electric on July 21 of this year became the nation's first operating utility company to serve a simultaneous electric demand for more than 5 million kilowatts. It was able to do this by constant planning and construction of new facilities. Typical of these facilities is the Haas Powerhouse, pictured on the cover this month, which has a capacity of 128,000 kilowatts. Located on the North Fork of the Kings River this has been placed in operation in the last two

years. It is the first large underground hydro-electric plant in the United States.

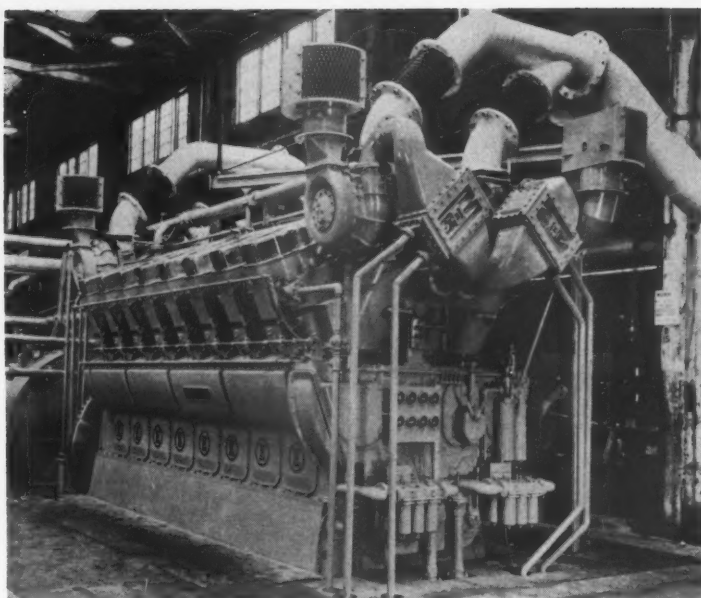
Western power companies are now making plans to double their present capacity by 1970 and quadruple it by 1980. Present 1960 estimates for nine Western states (excluding Wyoming, Colorado and New Mexico) are 144,200,000,000 kilowatts. In 1980 the total use is estimated at 379,700,000,000 and of this total figure industrial use is estimated at 168,013,000,000 kilowatts, or almost half of total use.

While electricity from power companies provides most of our Western industrial power, natural gas is also important. Natural gas is not only used as a source of industrial heat but also as source of power itself, heating boilers for steam turbines and powering industrial engines. L-P gas has recently found favor in Western industries as a source of power for industrial plant vehicles, and some firms such as Gates Rubber Co., Denver, Colorado, are switching over to L-P gas, feeling that savings will result from reduced maintenance costs.

A number of plants are equipped with supplementary or standby electrical power sources. These vary from power plants using steam turbines to generators powered by gasoline, diesel or natural gas. The latter vary in size from large stationary units to small portable sets.

In the larger plant power units, the trend is to better control. Here automation is coming in. Controls are

→
TURBOCHARGED RV-16 stationary diesel engine installed in a Western power plant turns a 3,500 kw electric power generator. Manufactured by Enterprise Engine & Machinery Co., San Francisco, the engine is a four cycle, 17-in. bore by 21-in. stroke unit rated at 4890 hp. at 360 RPM.



centralized on one board. The newly opened Bethlehem Steel building in San Francisco operates their heating and air conditioning system from a control system typical of the new trend. Using a telephone dialing method an engineer seated at the control panel can turn on or off any of the many items in the system, including pumps, fans, boilers and generators. Other control systems coming out this year are equipped with automatic intelligence systems for regulating performance of power plants. They are designed to figuratively "take the pulse" of operating units, analyze the individual operations and regulate controls to secure optimum economy in the overall operation of the plant.

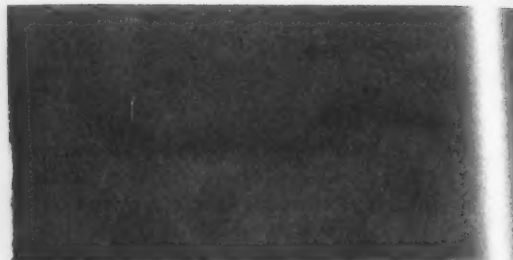
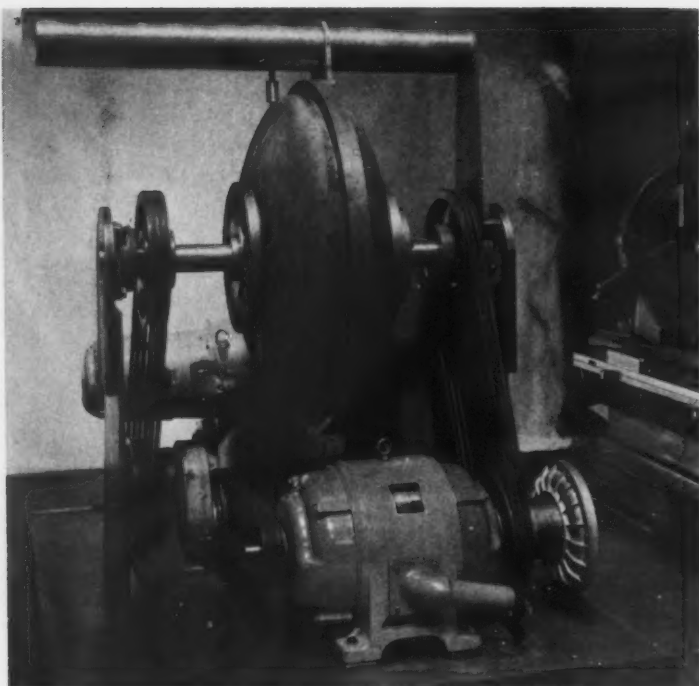
For medium size power plants diesel engines are popular. Vandenburg Air Force Base needing a separate power source for the Atlas Complex has installed an 800 hp. diesel-electric generating plant which consists of six 4 cycle, 8 cylinder turbocharged Nordberg diesel engines. Using diesel engines provides compactness and dependability, both desirable qualities.

Power units, especially those of the smaller sizes,

are being used in Western plants where additional power is needed or where standby power is important. Here both gasoline and diesel units, such as those produced by Fairbanks Morse, are found. Plant engineers are seeking compactness in these units because floor space is valuable. They also want portability, since plant layouts change and this gives them added flexibility. Since these units are often stand-by sets, both dependability and limited maintenance are important features and there is a definite trend towards designing with these in mind.

→
BOILER FEED PUMP designed by Pacific Pumps for installation in So. Calif. Edison's Huntington Beach steam plant. One of these full capacity main pumps is used with each boiler and driven through a fluid coupling by the main generating turbine at 3510 RPM. Pump capacity is 3865 GPM, with suction pressure of 120 lbs. and water temperature 328 degrees F.





NEW type sheaves and belts and a dry fluid drive contribute to the efficiency of a compact new colloid mill designed and built by Mead Cornell, San Francisco, California, for homogenizing petroleum products.

Over-all dimensions of the new mixer were held to a minimum by utilizing Dodge Dyna-V belt drives, which are smaller, lighter, and less expensive than wide-groove drives capable of transmitting the same horsepower.

Anticipating the probability of overloads due to the viscosity of the products being mixed, the manufacturer has specified a Flexidyne dry fluid drive for mounting on the shaft of his 50 hp motor. This insures soft starts for the mill and is set to slip under overload to protect both motor and mill from damage.

MOTORS

Throughout industry today there is a trend towards standardization. Nowhere has this been more apparent than in the field of motors. NEMA, The National Electrical Manufacturers Association, in the past several years has initiated a sweeping new set of frame and horsepower standards of motors having more horsepower for the same size. These motors were the result of improvements in synthetic insulations, newer and better silicon steels and heat transfer techniques. Western plants have received a greater benefit through this standardization than other areas because they have had a greater opportunity to utilize the newer, more compact motors.

The new motors also have an advantage of being more trouble free from the standpoint of maintenance. Compactness allows greater freedom of use especially in limited space applications. Several Western power transmission authorities when interviewed stated that industrial plants are no longer interested in using motors built to last a long period of time. Instead they are seeking a motor which will give trouble-free operation for 10 to 15 years. By that time the motor will probably be obsolete due to newer developments. As a result motors are being selected in the range of their capacities instead of over the range of their capacity as was formerly the practice, and motors are being run in many cases at up to load capacity.

MECHANICAL POWER TRANSMISSION

The West is in a particularly favorable position in the power transmission field. New plants provide an opportunity to utilize the newest developments in the

field. This is coupled with a trait, particularly Western, of accepting newer developments as they come out. As one power transmission man put it, "Western plants are more generally new and like to keep it that way. Plant personnel are willing to try out new devices."

There have been a number of new developments in power transmission in the last few years. Taken collectively they have advanced the field considerably. What has happened is that in almost all areas of mechanical power transmission there have been improvements in equipment which have expanded their practical usage. Thus we see V-belts with increased capacity moving into applications for which formerly they were not considered. High speed chain has been developed and is available either in self-lubricated form or totally enclosed to run in oil. Chain has become more competitive in this area. Timing belts are becoming stronger and larger and are competing in certain applications with both chain and V-belts.

Western plant engineers when considering a new power transmission application now have an additional selectivity in choice of types to use. While there are still certain general areas where each type functions best, selection must be made on the individual application, and with the new advances in the field it is possible to cut power transmission costs considerably with the right selection.

BELTS

V-belts are definitely the most widely used type of belting. Their use is increasing. Recently improvements in compactness and strength through the use

of dacron, nylon and steel cable have enabled manufacturers to come out with a much smaller belt with more strength than standard size belts. Carrying more power in less space, sheaves and pulleys can be reduced, saving space and money.

Of importance in considering V-belts is their relatively low initial cost and maintenance. They are easy to replace, convenient to handle and store. V-belts are universally available too. Another feature of V-belts is low cost flexibility in speed ratios achieved with adjustable sheaves.

Flat belts for power transmission are generally on their way out. However, a new type of flat belting by R. & J. Dick is now on the market and is attracting attention. The belt is plastic and can be spliced together at the plant into an endless belt of any length using pressure and heat. Its greatest use has been in the fractional horsepower field. Because of its resistance to humidity, oils and acids, the belt has numerous applications in the Western paper and food processing industries.

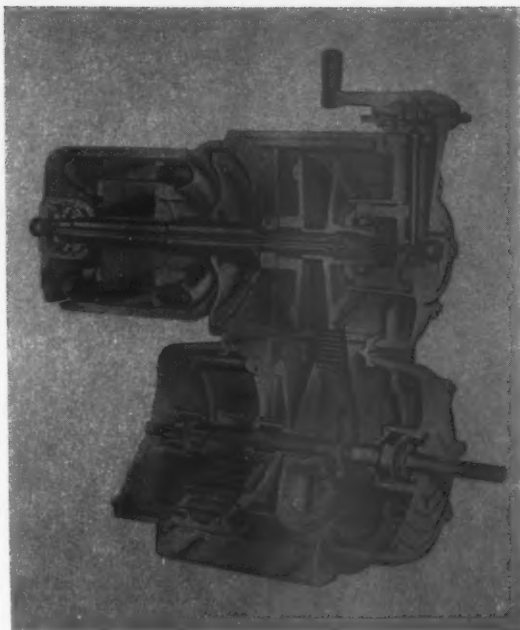
Timing belts are becoming increasingly popular. A development of the last ten years, these belts have had their main usage in such applications as business machines where extra light belting is used and where synchronization was necessary. Timing belts are being developed fast and now belts are available for power applications up to 200 hp. Advantages are long life, limited space required, and synchronization. In the West the lumber industry has many timing belt applications.

CHAIN

Open slow speed drives are natural applications for roller chain. It is dependable, long lasting and compact. Chain drives are flexible, providing a relatively simple and inexpensive means of varying speeds by changing sprockets. There has been a general metallurgical improvement in chain quality in the last few years. A number of firms offer high speed chain and self lubricated chain is coming in. This is an area to watch for increased development in chain. Food canning companies are using a number of chain applications where the chain is non-corrosive bronze or stainless steel. Link-Belt recently introduced a new variable speed drive for capacities up to 50 hp. which consists of twin strands of a unique single roll chain operating between a pair of facing wheels which have a floating center disc.

GEAR REDUCERS

Standard types of speed reducers include helical and herringbone reducers, wormgear reducers, and bevel gear reducers. Helical and herringbone reducers, such as those by Falk, are dependable and desirable for heavy duty use, high temperatures and abrasive environmental conditions. They can withstand heavy shock loads and are made of a few readily interchangeable parts. Wormgear reducers are mainly for transmission of right angle power. Input speeds are high, and short centers provide high ratios in a small space. They possess high resistance to shock loads. Bevel gear reducers are suited for right angle drives



CUTAWAY PHOTO of new mechanical adjustable speed drive by Louis Allis, showing enclosed drive housing with moisture resistant motor, single and ventilated. Flexible design allows mounting on floor, wall or ceiling without special tools to relocate conduit box, output shaft, mounting feet, etc.

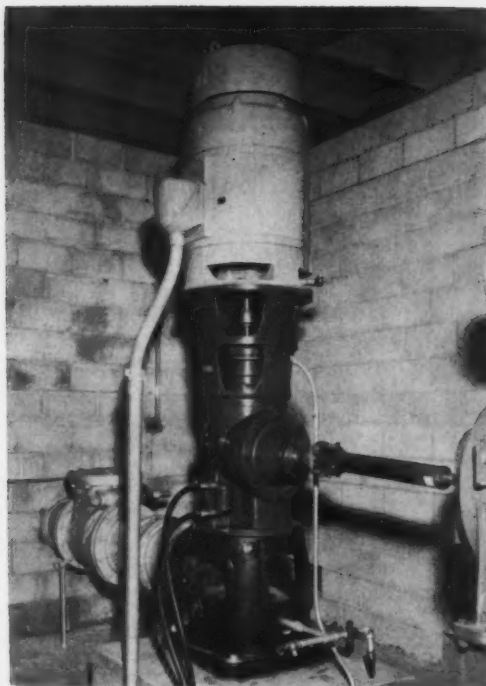
and possess a wide range of applications. Horizontal or vertical use is possible depending on the model.

One trend in speed reducers is to shaft mounted units. This type of reducer mounts directly on the driven shaft. Not only is it lighter but it occupies considerably less space.

Gear motors might be called the "Cadillac" of the power transmission industry. While more expensive than some of the other methods gear motors are long lasting, require little maintenance, extremely compact and do their job well. Gear motor installations in the West are increasing, aided by their trend towards standardization.

Three years ago 80% of the gear motor manufacturers made an integral gear motor. Now all of them make medium range horsepower gear motors in separate units which are coupled together. This allows the use of standard motors.

The new gear motor developments have provided a product which consists of a standard motor and a gear case. These when placed together gives a built in alignment which needs no maintenance. General Electric for instance recently redesigned their line of gear motors. For flexibility only six basic gear housings. In the second stage of gearing each of the six frames has only one ratio. The gear box output speed is thus determined by the various high speed sets used. In making a change in the output speed the final gearing is not disturbed. For ease of maintenance between



← NEW automatic combination right angle gear drive with electric clutch in city pumping station at Modesto, California. Unit, called Redi-Torq, is built by Johnson Gear & Mfg. Co., Ltd., Berkeley, Calif., and designed for use with dual engine-motor driven vertical pumps. Installation is simple as either flexible shafting or couplings can be used between engine and gear drive; engine clutch is unnecessary. Sizes range from 15 to 200 hp.

the motors and gear sets GE has designed built-in pullers in the pinion gears and a puller in the driven gear. All gearing is in a single carrier and for ease of routine inspection the carrier is removed from the heavy gear case and becomes a work bench item.

VARIABLE SPEED DRIVES

There are a number of variable speed drives on the market including those which operate with V-belts, timing belts, chain, fluid drive, planetary and hydrostatic. One of the newer drives operates with a constant speed disc on the motor shaft, a shifting device and a variable speed disc on the driven shaft. Louis Allis has a new AC motor driven mechanical adjustable speed drive for sizes up to 30 hp. Maximum output speeds range from 1 to 10,000 RPM and sizes are available with speed ranges as low as 20 to 1 and as high as 8 to 1. The unit is belt driven and by adjusting a dial, which determines driven pulley width, the desired output speed is easily obtained. Belt tension adjusts automatically and four bearing design eliminates overhung discs to maintain belt and disc alignment.

In addition to the mechanical variable speed drives there is a trend to variable speed electrical equipment to drive speed reducers. Users of this type of equipment are able to match production rates and synchronize speeds to better, more economical rates. U. S. Motors Varidyne system for instance can control any number of motors at a desired speed.

COUPLINGS, BEARINGS, PILLOW BLOCKS

In the flexible coupling field one of the newer trends

is in the rubber tire type of coupling. This coupling manufactured by Dodge under the trade name Para-flex has been developed considerably in recent years. Formerly use was in the smaller sizes however there has been a gradual enlargement of sizes, and couplings are available in a heavy duty disc type. Couplings are now used in the 1000 hp., 24-in. dia. range. High speed ranges are $4\frac{1}{2}$ hp. per 100 through 5200 RPM up to 47 hp. per 100 through 2430 RPM.

The story in both pillow blocks and bearings is the same. There has been a general gradual improvement in both mainly due to two items, better, more lasting bearing materials and seals. These two items can be expected to give longer, more trouble free service than ever before.

CLUTCHES

Electrical clutches are increasing in use in the West. The magnetic clutch is fast acting with low maintenance costs. It provides a shockless, vibration-free drive. Also popular are air clutches such as the Fawick Air-flex clutch. Kaiser Refractories & Chemical Div. at Moss Landing, Calif., has used these with excellent results on brick presses (See June, WESTERN INDUSTRY, page 57). Air clutches provide precision stopping, safety and low cost maintenance.

HYDRAULIC AND PNEUMATIC

The trend in both hydraulic and pneumatic use is up. Strangely enough there seems to be less competition between the use of air or hydraulics and mechanical than one would think. A hydraulic authority when questioned made the remark that usually one complemented the other, and that often the two were used in conjunction with each other.

Pneumatic power has its greatest use in Western plants as plant air. In this connection most plants have set up compressed air systems. Whether the system consists of one centralized compressor or several



Photo courtesy Bridgeport Brass Co., Bridgeport, Connecticut

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*Photo courtesy Cornell Paperboard Products Co.
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smaller ones located at appropriate locations on the system, is a question of plant need and suitability. Both methods have some advantages and disadvantages. Whichever method is used, it is important for plant flexibility that enough outlets are provided and in convenient locations. Plant air has many different power uses, cleaning, air vises and chucks, making machine tools more automatic, powering portable tools, air hoists, sand blasting, etc. For other applications such as vacuum melting a separate installation is usually provided.

Of interest to Western plants is the manner by which air power can be inexpensively converted to hydraulic. Here the simplicity, low initial cost, and low maintenance of air power is coupled with the smooth precision feed controls of hydraulic power. This is done by an air hydraulic booster installed near the point of use to which plant air is attached. The booster converts air to hydraulic power and boosts it to ratios up to 100 to 1.

The heart of any pneumatic system is its compressor. The trend in modern compressors is to compactness, ease of installation and low cost, quiet operation. There seems to be a trend towards compressors of the rotary type. Compressors such as the Ro-Flo by Allis-Chalmers offer advantages of low maintenance due to less wear and fewer moving parts. In addition this type reduces vibration.

In the West hydraulics has received an added im-

petus from the aircraft industry. This industry has done extensive work in the field and much of the power required to operate accessories on planes is provided by hydraulics. Some of the developments and devices have been adopted for other uses by Western engineers.

Most hydraulic installations are made for an individual piece of equipment and are integral with it. Presses and hoists operated hydraulically are an example. Hydraulic power is widely used on mobile plant equipment such as lift trucks where compactness and smooth power are necessary for lifting.

One trend in hydraulics is that pressures are getting higher as industrial demands for more power usage increase. In addition to piping, hydraulic hose, though more expensive, should be considered. It not only offers flexibility but will take shock. Some firms are selling rejects of hydraulic hose made for aircraft use, which does not quite measure up to extremely high U. S. Government standards, yet is more than adequate for commercial use.

Pumps are manufactured for many different purposes. Not only do they provide the basic power in any hydraulic system but they are also used in power plants as accessory equipment. The trend here is to standardization with interchangeable parts, dependability and long life with low maintenance. Manufacturers are using a variety of new materials to help eliminate corrosion and abrasion.

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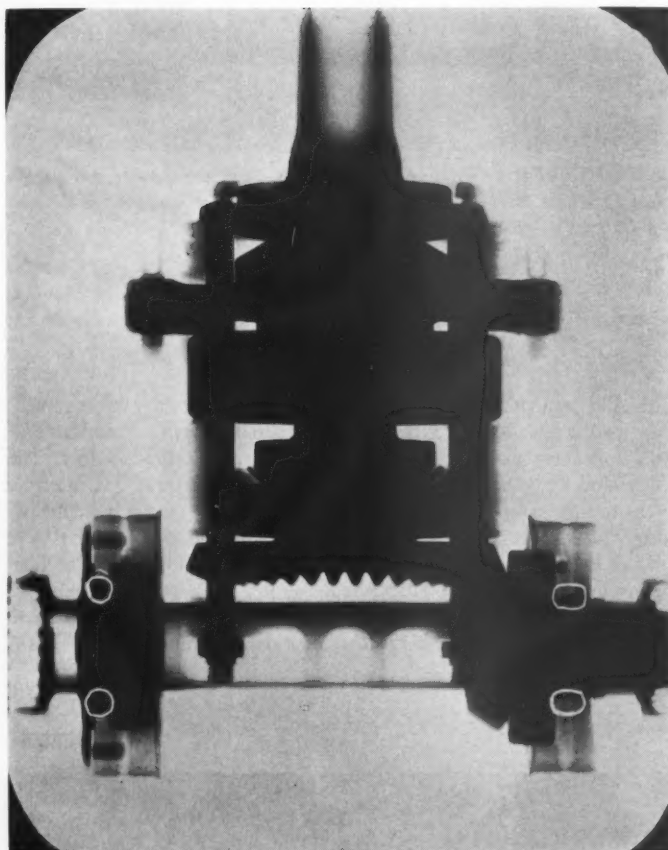
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WESTERN INDUSTRY/SEPTEMBER 1960



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RADIOGRAPH SHOWS accessory drive section of Boeing small gas turbine engine. At lower left can be seen bearing cap which is slightly out of position and needs to be replaced. At lower right are two lubrication grooves that need realignment. Pencil marking on radiographs indicate affected areas.

NEW WAYS to use x-rays

A Western aircraft plant has increased the uses of radiographic inspection through research and imagination.

IMPROVED METHODS in the use of radiographic equipment have established new milestones in quality control at Boeing's Industrial Products Division in Seattle.

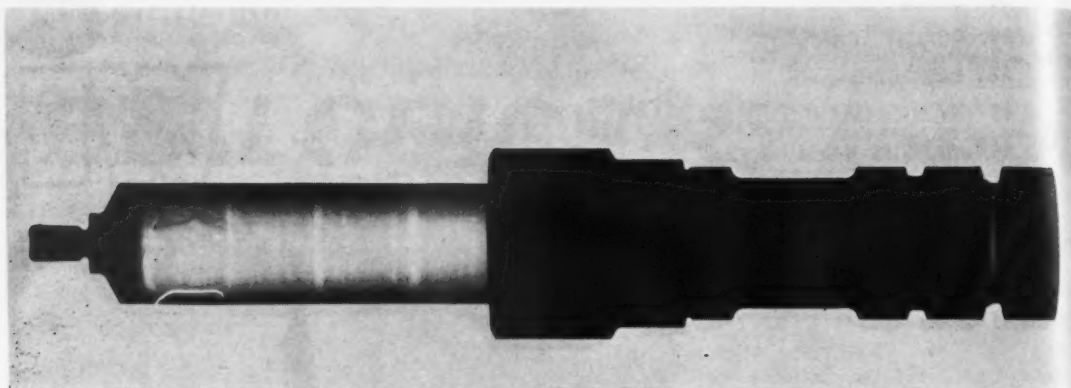
One of the major developments has been the nation's first use of X-ray for non-destructive identification of alloys on a production basis. The use of X-ray as a dimensional tool to check the concentricity of hollow turbine shafts and other internal surfaces also has added to the effectiveness and accuracy of the divi-

sion's quality control procedures.

The Industrial Products Division X-ray laboratory is one of four maintained by Boeing. Equipment consists of a 250 kilovolt peak 10 milliamperes, jib boom X-ray machine and a 150 kilovolt peak 8 milliamperes automatic unit.

The alloy identification system worked out by the division's X-ray technicians has firmly nailed down quality control standards in a difficult area.

Bearings of two very similar aluminum alloys pro-



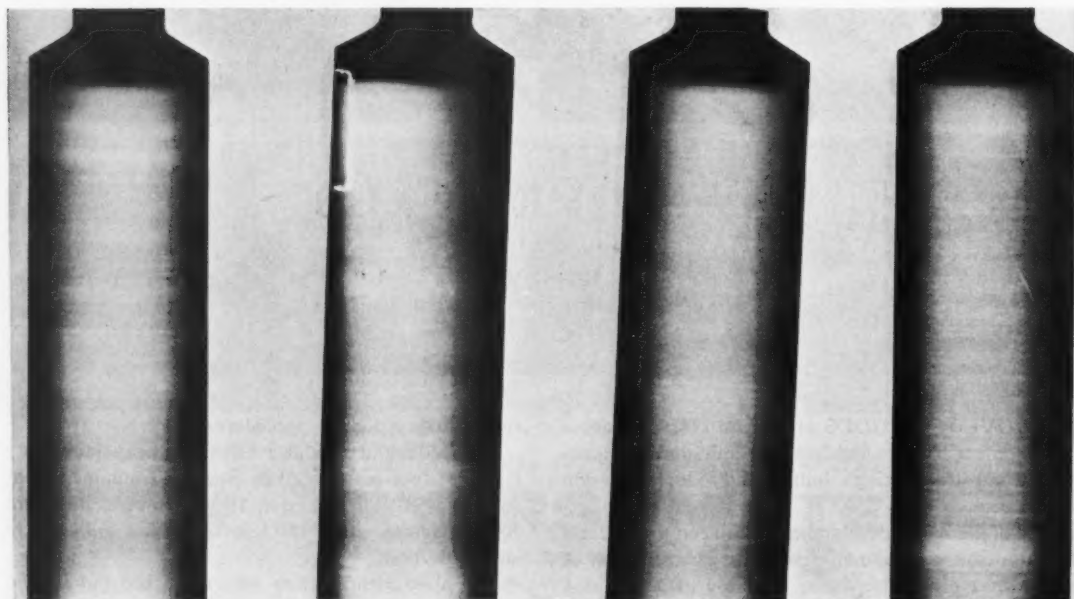
RADIOGRAPH OF SHAFT on Boeing 240 horsepower gas turbine. Technique developed in Boeing Industrial Products Division laboratory sharply defines walls of hollow shaft, permitting measurement of dimensions to .005 inch. Shallow area near spline end of shaft reveals slight drilling gouge in internal diameter. Pencil marking on radiograph indicates affected area.

duced by subcontractors are used for turbine wheels and shafts which turn at speeds up to 36,000 rpm. Sub-contractor parts normally are spectrographed to determine the specific alloy. However, in the instance of a turbine bearing, the spectrographic arc would destroy the surface finish and consequently the usefulness of the bearing. A non-destructive method of alloy determination had to be established.

Research engineers of the division's X-ray unit tackled the problem and found that at a definite kilo-

volt range the density of radiographs of the two alloys varied and the bearings were easily identified after X-ray. The current production procedure is to place as many as 20 wrapped bearings on an X-ray plate, together with a standard of the two alloys, and radiograph by a prescribed procedure.

The Boeing X-ray operation is continuing to broaden its work in alloy identification. An alloy check is now run on all turbine and stator blades for the Boeing small gas turbine engine prior to the production cycle.



RADIOGRAPHS OF PORTIONS of small gas turbine hollow shafts, shown here, are used to check shaft concentricity. Center shaft has thin wall (.025 inch) which does not meet .045 inch minimum thickness and was rejected. Pencil marking on radiograph indicates affected area.

The X-ray laboratory has standards for numerous cobalt, iron and nickel base, as well as stainless and other alloys—Haynes-Stellite 21, 30, 31 and 151; Hastelloy X, 19-9DL, 19-9DX and 310; GMR 235; Udimet 500, 700 and 713C; Cromadur and Nicrotung.

A recent example of the effectiveness of the technique concerns the shipment of 300 turbine blades to Boeing from a subcontractor. The blades were automatically radiographed for quality, alloy identification and grain structure. One blade was found to be of the wrong alloy and stamped incorrectly. One out of 300 is not large, percentage-wise, but still might have become the weak link in a production turbine wheel.

The X-ray machine as a dimensional inspection tool has become an important operation at the division. Walls of the long, hollow shafts of small gas turbine engines are given radiographic inspection on a production basis and measured to within .005 inch. To check both wall thickness and concentricity, three X-rays are made. After each, the part is rotated 60 degrees. Radiographs also are used to check the internal alignment of turbine parts such as oil lubricant holes, meshed gears and bearings.

The Boeing division also uses color and ordinary black-and-white photographic film for industrial X-ray which results in the improved definitive quality of X-ray reproduction. Research engineers felt that by using color film they could obtain contact prints with better detail, contrast and enlargement capability than with industrial black-and-white X-ray film. A technique was worked out to produce radiographs in color which gave a new dimension in reproduction detail and contrast.

In addition to the use of color film in X-ray work, the division's radiographic laboratory has experimented with ordinary photographic black-and-white film as a substitute for the special purpose film previously used. The engineers found that the less expensive film could give results approaching the detail and definition of color film reproductions. This technique is now used on many inspection jobs.

Boeing's Industrial Products Division operates one of the largest aircraft quality aluminum foundries on the West Coast. A large part of the radiographic laboratory's work centers around inspection of castings. The inspection goes even farther in foundry control. X-rays of untrimmed castings are used to check for excessive turbulence in the metal during the casting process. Foundry molds are reshaped to eliminate this turbulence and the consequent buildup of gas holes in the casting.

Several new projects are now under study to broaden the scope of radiographic work. One of the major studies concerns the grain size of aluminum castings. A metallic grain which is too coarse will weaken a casting. Until now, however, foundrymen and metallurgists could not make an inspection of grain size without cutting the casting.

X-ray unit research engineers found a definite radiographic pattern for varying degrees of casting grain size. In cooperation with the division's foundry and metallurgical laboratory, the X-ray laboratory is now perfecting techniques to transfer these patterns into measurement of casting strength. Eventually, this method of X-raying castings will be developed as a



regular inspection procedure, when standards have been established. Radiographic inspection will be used to check the grain size of each melt prior to pouring castings.

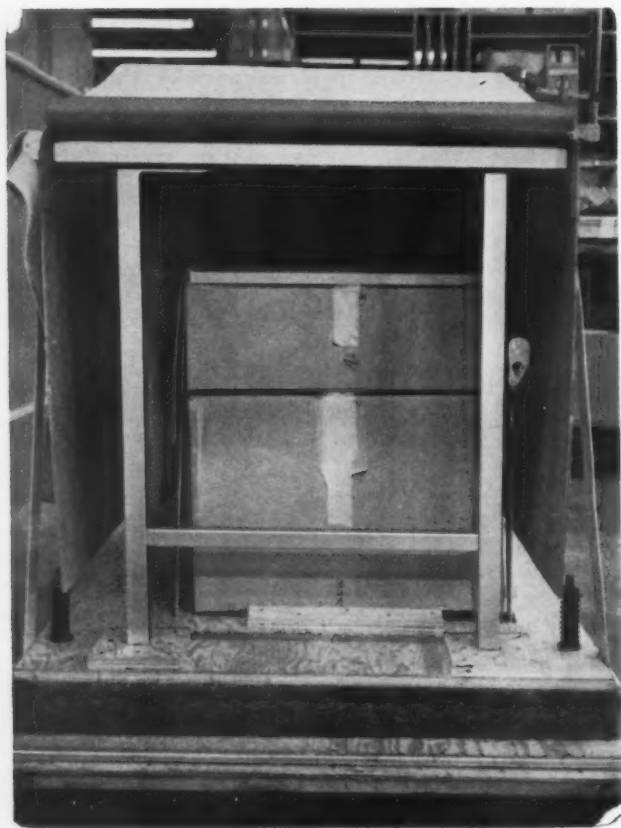
The Industrial Products Division X-ray laboratory also carries on an intra-company support program. As part of this program, the laboratory has worked with rubber, ceramic and plastic materials. Among its achievements is one of the first successful uses of X-ray on bonded aluminum honeycomb panels to determine the existence of possible core and foam defects. One of the techniques used resulted in a three-dimensional effect in which the honeycomb structure was visible from top to bottom. Other "firsts" are believed to have been the successful X-ray of printed circuits, leading to improved soldering methods and the use of X-ray as a dimensional tool to measure individual layers of bonded ceramic-metal material.

The X-ray is not a new tool in industrial quality control. Boeing, however, is finding many new ways to increase the effectiveness and scope of radiographic inspection.

REUSABLE PACKAGING can save money

Despite initial expense this method is gaining popularity. Results prove amortized costs are less plus bonus in reduced package damage.

REUSABILITY OF PACKAGING MATERIALS is gaining favor with Western firms who find that higher initial expense for more sophisticated containers with reuse value in the long run often saves money over one shot "shippers" that simply get the product to the customer, are ripped open and then head for the scrap pile.



SIDE VIEW OF PACKAGE shows various components. Latex bonded animal hair cushion serves as shock and vibration damper, is fixed to base of package and to mounting base with 8-in. bolts tied down with coil springs. Second set of straps hold subassembly in place.

A case in point is a new container developed as protective packaging at Autonetics Div., North American Aviation, Inc., Downey, Calif. The package supplants a formerly used one-way-item, has high reusability—at least three times—and knocks down into a self contained kit that can be reassembled in less than 15 minutes.

Housed inside is the Recomp, an Autonetics-built general purpose digital computer that brings gross weight of the package to over 500 lbs.

According to Robert D. Mericle, Autonetics packaging engineer, the container, ultimately used to ship the finished component to the customer, is also employed for inter-plant shipment of various sub-assemblies during fabrication. The customer also uses it to transport the computer to new jobs.

Too bulky for small capacity material handling equipment, the box is designed for fork truck movement and loading, is skid mounted and has a unique shock mounting system, dubbed the "biscuit pack," that prevents damage from droppage.

Key to success of shock mounts are three web straps with a quick release mechanism similar to those found on aircraft seat belts. Straps secure the computer to the plywood base of the shock mounting system.

Reusable in their own right, straps were hit upon to avoid expense of repeated steel strapping operations and allow packing and unpacking without tools. One exception is a screwdriver needed to pry off external Klimp fasteners, Mericle pointed out.

The so called "biscuit pack" consists of the base of the container on top of which is sandwiched approximately a three inch pad of latex bonded animal hair. On top of this is placed the mounting base that the Recomp is anchored to with the straps.

Pierced on four corners with 8-in. bolts ringed with 3½-in. coil springs, the mounting base is allowed to "float" on the animal hair cushion and has controlled lateral and vertical movement to absorb in-travel and handling shock.

Before the computer is placed in the plywood container it is covered with a corrugated paper shroud that protects it from any marking from tightened web belts.

The entire package is easily knocked down by one man into a flat, easily stored or shipped kit that is self contained by the straps. The box top, shroud pack, front, back and side panels are placed on top of each other and are cinched tight.



CLEATED PLYWOOD VENEER panels are locked into place and fastened with Klimps. Assembly takes less than one-quarter hour, does not require tools. A screwdriver to pry off Klimps is only dis-assembly item required.



ONE MAN HANDLES SEALZIT GUN that applies liquid roofing compound to surface via two outside tubes. Center tube carries glass fibre rovings that unite with compound to form tough surface. Strapped to gun handler's back is fibreglas reservoir. Hoses lead to pump and air compressor on ground.

PLANT ROOFING METHOD saves labor, costs less

Special gun is heart of system; sprays both liquids and solids. Work crew is reduced from 10 to 3 men.

MAINTENANCE COSTS INVOLVED WITH WESTERN PLANT roofs have risen in recent years not only from increased material and labor outlay but because the plant roof today is designed as something more than a device to shed rain and combat

the sun.

In the West, roofing has assumed an air conditioning function for worker comfort. In many plants it has to contribute to efficiency of temperature controlled clean rooms, process and fabrication areas,

and quality control operations involving delicate products and gaging devices.

Plant roofs constructed from built-up layers of rag or asbestos felt secured with hot-mopped asphalt no longer offer efficient insulation for these applications and have given way to more sophisticated insulating layers such as cellular glass, fibreboard, sealed with moisture resistant compounds.

Far from a cure all, aging, cracking and blistering has proven as pronounced in the new types of roofing as in the old.

To this has been added another problem. Roofs are being used more frequently as a base for equipment. In Southern California, the plant roof has become a work area for installation and maintenance of extensive air pollution control equipment.

Flashing and roofing around these items is difficult and roof wear is increased by the maintenance worker who walks on fragile surfaces and while working drops tools and fasteners that puncture surfaces.

A method that will lay a roof to cope with industrial needs has been developed by Pioneer Div., Flintkote Co. Called the Monoform system, it is a new cost saving method of applying roofing to flat and free-form surfaces.

Highly versatile, it has a number of non-roofing uses including protective coatings, waterproofing of plant floors, ramps and tankage; sound deadening and pipe insulation.

Basic tool of the system is the SealZit gun, a hand held device that under pressure shreds fibreglass rov-

ings and applies a sprayed liquid coating to the surface.

Any combination of aggregate and liquid may be blown onto a surface including sand, roofing granules, vermiculite, metallic powders, even crushed rock.

The gun has three ejectors, two for liquid formulations, one for glass roving. A pump and an air compressor surges the material via hose and through the gun when a single trigger is depressed.

An example of the system's labor saving aspects involves reroofing of the Townsend Co. Cherry Rivet Div., Santa Ana, Calif. Monoform was used over an eight-year-old conventional roof.

A three man crew (gun operator and hose handler on the roof—one man on the ground to handle pumping and compressing equipment) applied 6 to 8 gallons of Monoform compound, reinforced with 3 lbs. of glass fibre roving, Type I, per 100 sq. ft. (one roofing square) at the rate of 160 squares a day.

To cover the same area daily by conventional reroofing methods would require a 10 to 12 man crew.

Tight, hard to reach areas around ducting and air conditioning equipment were sealed with a tough Monoform membrane reinforced by glass fibres blown into the membrane in random inter-lock patterns.

According to Flintkote, the coating has uniform flexibility and resists breakdown from extremes of temperature. Superior wear characteristics are said to resist foot traffic more successfully than conventional built-up roofing.

Since Monoform is applied cold, fumes and worker injury from burns are eliminated.



OLD METHOD INVOLVES hot mopping of rag or asbestos felt material in conventional multilayer build-up roof. Insulation added to roofing in recent years to boost worker comfort and process efficiency has created maintenance problems.



SIDE OF PLANT is shown. Note steel beams on slanted ramp in easy position to place on roller conveyor. Trap door has been cut in wall so that beams can be pushed from outside into cut-off position. Shear on inside will cut to desired length as parts are needed.

CLEVER HANDLING IDEA aids production

Outside storage of steel beams saves space. Pushed through hole in wall parts are sheared to length entering plant.

EFFICIENT MANUFACTURE in any plant starts with efficient handling of the production material that goes into the manufacture of the product. This is doubly true at the Salt Lake City plant of Commercial Shearing & Stamping Co. since they fabricate various frameworks of steel beams used in construction and stamp out the heads or ends for storage tanks. As a result much of the production material they use is steel in the form of long H or I, or WF beams, plates and sheets.

To eliminate valuable indoor space being used for storage of the awkward, hard-to-handle beams, Commercial Shearing & Stamping now stores them outside. This has saved some 700 square feet of badly needed floor space for manufacturing. It has also eliminated the need for triple handling of beams by the overhead crane. No longer does the Harnischfeger 20 ton crane transport the beams indoors to the storage racks and when needed from there to the cutoff shear and then to the fabrication section. Overhead crane time is at a premium and the elimination of two of these moves has made more crane time available to actual production.

Not only are the beams stored outside but they are stored so that they can easily be transported to a slanted rack at right angles to the building. In front of this rack is a roller conveyor on which individual beams are placed. A small trap door has been made in the side of the building and inside the building, just in front of the trap door, is located a Pettinghouse cut off shear. This machine will cut any of the beams up to 10 inches in depth as well as squares and rounds. On the other side of the shear is another roller conveyor and a scaled stop for measuring cut off lengths.

In operation the beams are pushed through the trap door and shear to the stop and cut to required

lengths. From there they are pushed off the side of the conveyor and slide down rails to a crane loading area. Where beams come to rest on three rails off the floor so that a chain can be passed underneath for hoisting. As a result all beams inside the plant are those that have been cut to length and are needed immediately by production. When the cut off order has been filled the crane lifts the beams and carries them to the production area where they are needed.



PLANT INTERIOR showing cut-off shear near wall. As steel beams are pushed through trap door in wall they are sheared to length. In right foreground is floor storage area for cut parts, which are pushed off conveyor and slide down rails.

ODD LOT

AUTOMATION

with one machine tool

Tape control plus automatic tool selection device provides low cost automation for limited production items. This is how it is done.

ONE OF THE MOST COMMONLY HELD PRINCIPLES of machine tool operation in Western job shops is that of "economic lot size," in that a plant operator must have sufficient numbers of the same production item to justify costs of specific types of machinery, tooling, fixturing and engineering-planning staff.

Exploding this concept is Mill-A-Matic Machining Inc., a Santa Ana, Calif., job shop that is using a numerically-controlled Kearney and Trecker Milwaukee-Matic machine tool to automatically produce small to large-lot jobs for industrial customers. Involved can be groups of un-like parts that require a wide variety of operations.

The machine is designed to produce these parts with a minimum of tool change and setup time and is capable of performing milling, boring, counterboring, drilling and counterdrilling, countersinking, reaming, back facing and tapping with a variety of 32 tools.

Key to this versatility is a circular tool magazine serviced by an automatic tool changer. This device picks the programmed tool from the magazine, inserts it in the spindle, at the same time removing the used tool and returning it to the magazine. Tool change time is approximately .15 minute.

This function is tape controlled as is indexing of an 8-position palletwork table. The saddle, main column and spindle are power fed to automatically provide machining movement in three axes.

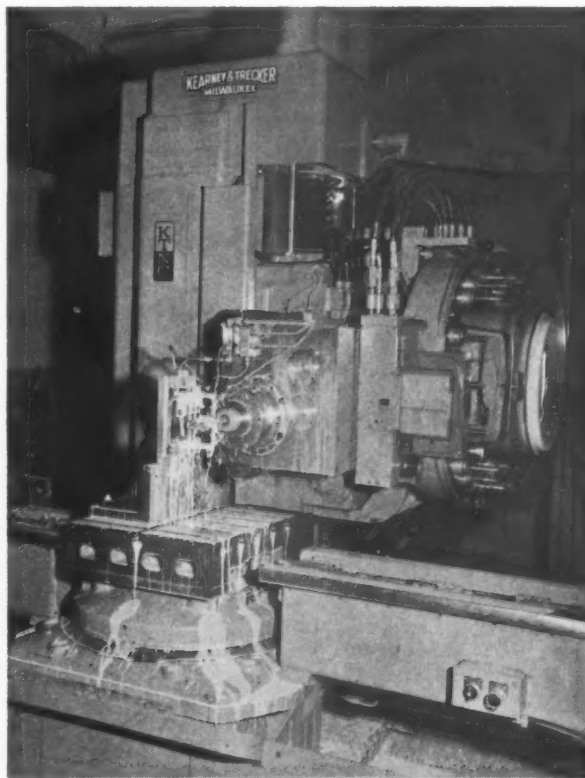
Basically, this is how a part is readied for automatic production at Mill-A-Matic machine.

Fixturing is designed and tooling is planned on paper after analysis of the part. Work-holding fixtures are roughed out in sketch form and refined into detailed drawings.

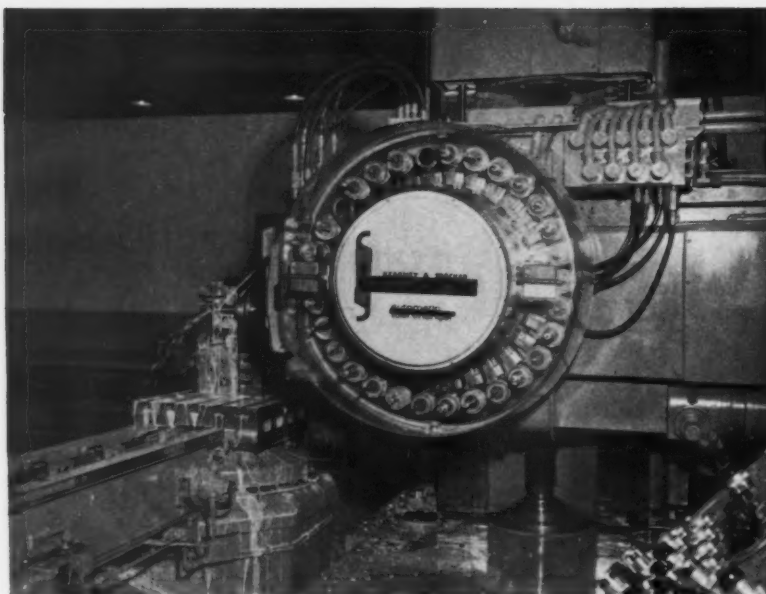
All data generated is placed on a process planning sheet. This will involve machine cycle time, description of tooling needed, cutting speeds and feeds, positioning and indexing criteria, tool change time, gaging and inspection time, and time needed for installing fixturing, and loading of tooling into the magazine.

Working from the process planning sheet, technicians choose and pre-set required cutting tools and fit

them into coded tool holders that fit into the magazine. Coding is in the form of rings on the shank of the holder. The tool selection device on the Milwaukee-Matic uses this code to recognize any of 961 different tools.



NEAR END OF MACHINING cycle, housing amplifier is milled by tool taken from storage drum, right, by automatic tool changer. Total machining time to finished part, 45 minutes.



←
FRONTAL SHOT OF TOOL MAGAZINE shows accommodation for 31 tools with one in the spindle. Tool selection device is equipped to recognize any of 961 different tools by means of code rings on tool holders.

While final processing planning continues, work-holding fixtures are produced on conventional machine tools at Mill-A-Matic.

The completed process planning sheet is then sent to a typist for copying by a Friden Flexowriter. This copying action activates a tape punching apparatus that produces a 1-in., 8-channel tape. This will be fed into General Electric program controls.

Work pallets, with the newly-made fixturing in place, are installed on the Milwaukee-Matic and re-

ceive final checking. Parts are placed in the fixtures and the pre-set tools and holders are fitted in the magazine.

After the punched tape is inserted into the reader, the machine is ready for production.

Currently in production at Mill-A-Matic are typical job shop parts involving light gage metal castings in small to medium lot sizes. These require a multitude of milling, drilling, reaming and tapping operations.

For example, a lamp housing made from 356 aluminum for Beckman Instruments has a lot size of 300 pieces with an annual requirement of 1200 units. The part is completely machined from the casting on the Milwaukee-Matic in 21 minutes.

Cycle time on conventional machine tools is 1 hour and tooling totals \$575.00. Tooling for the automatic unit costs \$175.00 less and requires no setup time as compared with 3½ hours allotted to the standard method.

Conventional machining requires two machines. In addition to operator costs, indirect labor is involved in moving parts between machining centers.

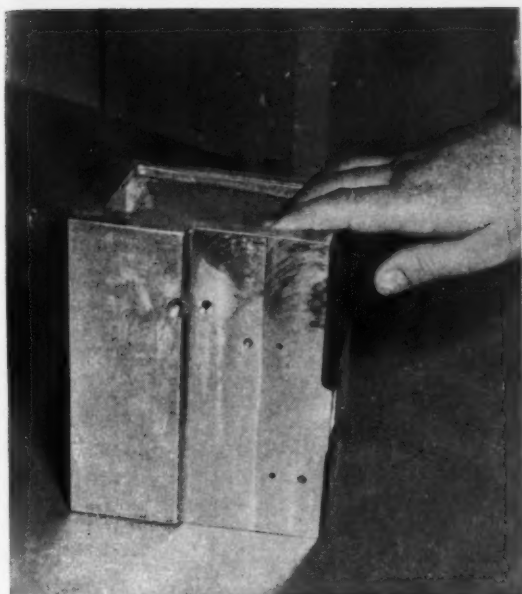
Another part, smaller in dimension, but with an increased lot size of 150 monthly, involves a housing assembly for Autonetics. This is a delicate casting, prone to bending and heat warpage due to thin walls and a number of milled surface slots.

Here again, conventional machining requires a series of tools with resultant indirect labor costs. Conventional setup time is 6 hours while the Milwaukee-Matic requires none, and finishes the part in 45 minutes.

Standard cycle time is 3½ hours and requires \$500.00 for tooling, \$300.00 more than with the automatic system. Due to automatic shuttle loading, the machine can operate reciprocally between two parts. Loading, set and change-over is accomplished off the machine and without downtime.



HOLDING A SMALL AND DELICATE housing amplifier assembly, John Dooley, West Coast manager, Kearney & Trecker, explains details of tooling and fixturing to prevent warpage and bending of material during machining.



ALUMINUM LAMP HOUSING is drilled, milled, reamed and tapped with 4-40 and 8-32 Heli-Coil threads. Milwaukee-Matic did job in 1/3 time needed for conventional methods.



MACHINIST ADJUSTS FLOW OF COOLANT over aluminum lamp housing anchored in holding fixture. This part was finished in 21 minutes, is made from 356 Aluminum.

Basic advantages of the machine to the job shop plant start with high machine utilization, according to Vaughn Clark, Mill-A-Matic president.

Utilization becomes a constant factor, he points out, since machine time necessary to produce a given number of parts is not dependent on lot size, sequence of production, or operator skill.

Floor space, a critical item in many Western plants, can be freed from a scatter of dormant machine tools and excessive inventory space, he added.

Often large areas of floor are covered with work in process, finished parts inventory, tooling and material handling equipment involved with conventional lot-type production, he said.

Much of this is avoided with the automatic system, he added, since the machine can produce parts as

needed. In-process inventory is practically eliminated and shelf inventory can be reduced in proportion to reduced lead time needed by the Milwaukee-Matic.

Lower inventory means less taxes, depreciation and carrying costs, a matter of great import to any Western plant operator, large or small, Clark concluded.



→


EXPLAINING TOOLING CHECKS carried on by optical comparator, Bob Knutsen describes preparation and pre-setting of tooling in controlled atmosphere. Tools go through "soaking" period in controlled temperature to allow for expansion-contraction differentials.

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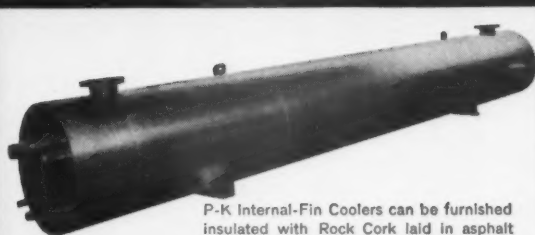
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AGAIN



P-K Internal-Fin Coolers can be furnished insulated with Rock Cork laid in asphalt and covered with a heavy steel jacket. Illustration shows insulated cooler.

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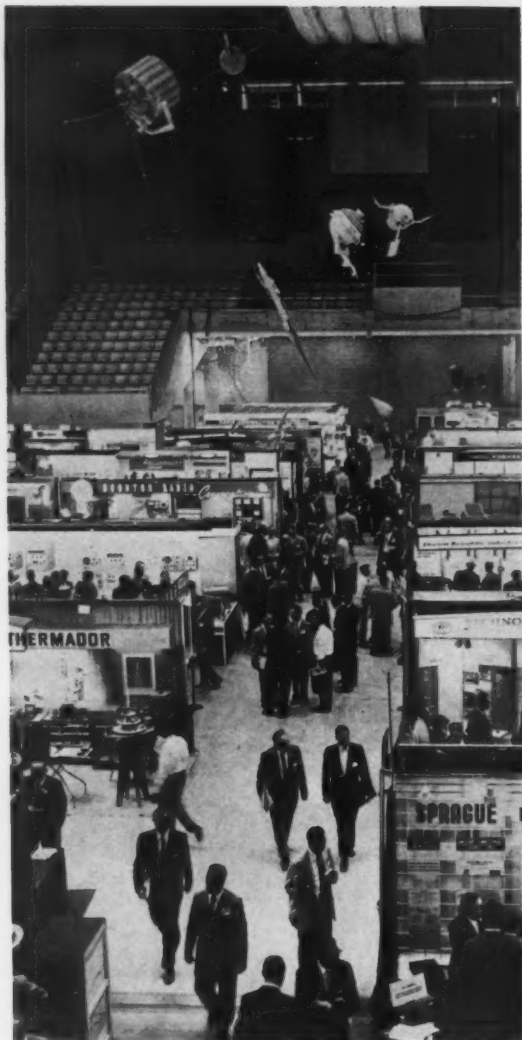
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TYPICAL SHOT of the WESCON show, the largest non-public show to open in Los Angeles this year.



OPERATING MACHINE FOR FLEXLOC locknuts are Don Betts, left, and Joseph C. Gaughan, manning the Standard Pressed Steel booth.

WESCON in 1960

One of the West's most important shows; it becomes more authoritative each year. Here is what happened.

WESCON, WESTERN ELECTRONIC SHOW AND CONVENTION, the largest non-public trade show to open in Los Angeles this year, readily surpassed early attendance estimates of 35,000, as plant management, engineers and technicians toured more than 980 exhibits of advanced electronics and related equipment.

The event, operated on a non profit basis, is co-sponsored by the Institute of Radio Engineers and the Western Electronic Manufacturers Assn. Jamming the entire Los Angeles Sports Arena and 56,000 sq. ft. of tent annex were exhibiting firms showing wares ranging from accelerometers to zero backlash gear assemblies.

Discussions and panel sessions were held by 210 electronic scientists and engineers. Six conference rooms held 44 technical meetings geared to accommodate 600 visitors each.

Far from concentrating entirely on technicalities of microwave theory, new semiconductor devices and the engineering disciplines of the current satellite programs, WESCON technical sessions also considered universal industrial and engineering problems.

Among these topics was vehicular communications, a subject of growing importance to efficiency conscious plant management. Under discussion in a panel led by D. L. MacDonald, Pacific Telephone and Telegraph, Los Angeles, was a new antenna for vehicles communicating in the 30 to 76 mc frequency range. This is a new whip antenna without telescoping sections, moving parts or adjustment devices in the antenna itself.

Of further interest in the field of industrial communications was a description by John F. Mitchell, Motorola, Inc., of their new 7500 subscriber-capacity personal radio paging system that can operate on a direct city-wide basis and can be installed in conjunction with existing vehicular equipment.

Another personal communication system, developed by Bendix, was described as having a receiver assembled entirely from individual circuit modules.

These can be replaced on an individual basis if found faulty, thereby minimizing down time.

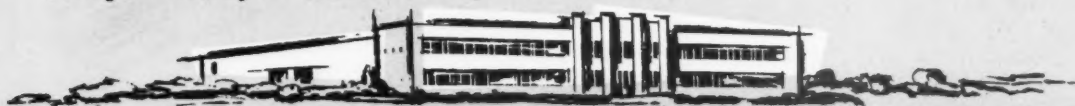
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TURN PAGE FOR FURTHER INFORMATION ➡ ➡ ➡

He said that new FAA proposals might trigger wholesale replacement of current radio equipment to meet demands of the Air Traffic Control System. But before the items are replaced they must be designed and built, he concluded.

Under leadership of a panel including J. B. Lewi, Packard Bell Electronics, Los Angeles; N. Klumph, Philco Corp., Palo Alto, Calif., a discussion was developed involving concern of industry over time effort and cost of engineering proposals prepared in the scramble for contractual business.

Panelists concluded that increase in cost of systems made by electronic firms for the government can be attributed to the "proposal program" and the stiff competition for defense contracts.

Under discussion were government and industry viewpoints on how the most qualified bidder for business can be selected and still reduce total proposal costs to all bidders.



HOLDING A SAMPLE OF gold cored silver wire between them are Herman A. Folgner, Western regional manager, Handy & Harman, left, and Earl Lund, sales engineer. Exhibit featured precious metal alloys of silver, gold and platinum for industrial use.



→
VISITORS FLOCKED TO ENTIRE LENGTH of Minneapolis Honeywell exhibit. Divisions represented were Heiland, Industrial Systems, Marion Electric Instrument, Micro Switch and Semi-Conductor. On display was everything from recording paper to infrared sensors.



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CIRCLE APPROPRIATE KEY NUMBERS ON POSTCARD, P. 86

RADIANT PLATE ELEMENTS

Booklet discusses the many advantages obtained in using radiant plate elements in high temperature furnace design and construction. Explains the various types available including "U" pin suspended elements, helical coil elements, non-metallic rod elements and equalized radiant tube elements. *Pacific Scientific Co.*

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WIRE ROPE SLING CAPACITIES

A new handy pocket card shows revised rated capacities of line of eight-part braided wire rope slings. A quick reference table shows rated capacities for the various sizes of the slings used vertically, or as choker hitch or basket slings. The reverse side illustrates suggestions for proper sling care and use. *American Chain & Cable Co.*

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MANUAL ON PUMP MOTORS

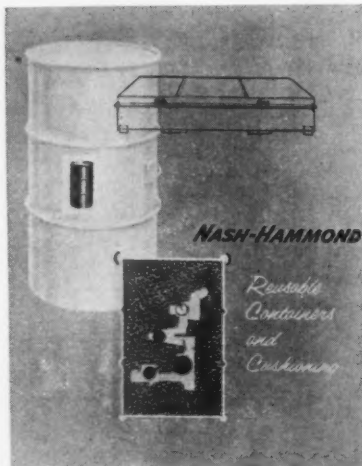
This 32-page booklet contains a collection of technical articles on pump motors. Included are: What you should know about turbine pump motor lubricants; Facts about pump motor bearings; The why and how of pump motor protection; Pumping stations and sound control; and Helpful steps in submersible installations. *U. S. Electric Motors Inc.*

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ELECTRONICS IN TESTING

The role of electronics in testing machines is the subject of this brochure. Traces the development of the electronic null balance principle and recent developments in automatic read-out systems for printing ultimate and intermediate test data, such as yield strength, and low capacity load cells. *Tinius Olsen Testing Machine Co.*

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SPACE AGE PACKAGING

Cushioning materials and reusable shipping containers used in the protective packaging of fragile space age products are fully described in illustrated brochure. Shipping containers are discussed in detail, including materials, types and applications. *Nash-Hammond, Inc.*

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MINIATURE COUPLING

Bulletin describes a new miniature coupling designed for flush mounting that is adaptable to test set-ups, panel boards, bulk heads, and other applications. Explains a unique locking mechanism that permits fast easy set-up or changing many types of test setups. *Perfecting Service Co.*

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AUTOMATIC WELDING

Folder illustrates and describes complete line of automatic and semi-automatic arc welding equipment. Applications for different automatic welding processes including inert gas, carbon dioxide, open arc and submerged arc, are also illustrated. *Hobart Bros. Co.*

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RUBBERIZED ABRASIVE USES

Manual on the many uses for rubberized abrasives gives case histories on a variety of typical applications. Outlines most efficient methods for mounting, dressing and trueing. Recommended operating speeds are also listed. Shows how a single operation often replaces slow hand-finishing methods. *Cratex Mfg. Co.*

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PHOSPHOR BRONZE HANDBOOK

Technical handbook gives detailed explanation of continuous casting as well as data on phosphor bronze wire, bars, rods, strip, sheets, circles and special shapes. Flexograin, a special fine-grain phosphor bronze, is also discussed. Includes specifications on six of the phosphor bronze alloys. *H. K. Porter Co., Inc., Riverside-Alloy Metal Div.*

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ANTI-RUST CONCENTRATE

Brochure describes a special anti-rust concentrate, discusses functions and problems of modern-day cooling systems and the value of using rust inhibitors. Covers use of the concentrate in lubricating water pumps. Also gives historical aspect of rust and a four-point program for better cooling system maintenance. *Lubrication Engineers, Inc.*

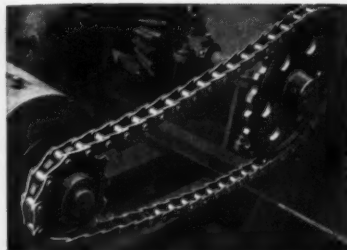
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GRAPHITE CLOTH

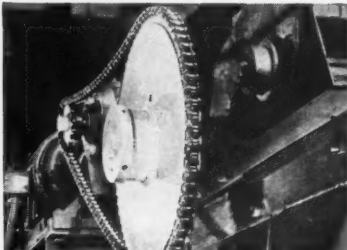
Detailed property data on graphite woven fabrics and their relation to a variety of industrial applications are included in this technical bulletin. Discusses textile characteristics, and applications in the following: thermal, plastic reinforcement and inclusions, electrical, mechanical and chemical. *National Carbon Co., Div. of Union Carbide Corp.*

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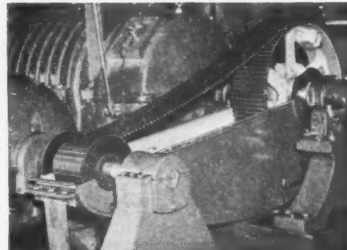
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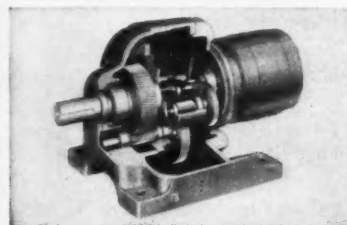
MALLEABLE IRON, PROMAL AND STEEL CHAIN DRIVES—Complete line of cast, combination, forged and fabricated chains plus matching sprockets.



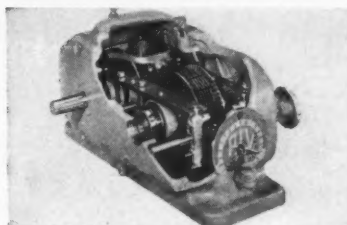
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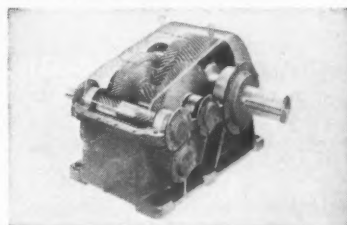
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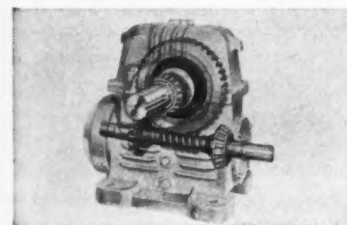
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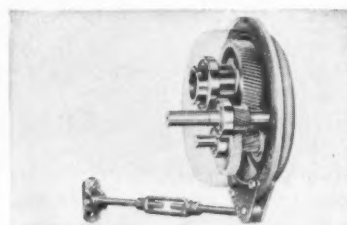
P.I.V. AND RS P.I.V. VARIABLE SPEED DRIVES—Stepless, instant variation in ratios to 6:1, 9 sizes, 21 types, up to 50 hp.



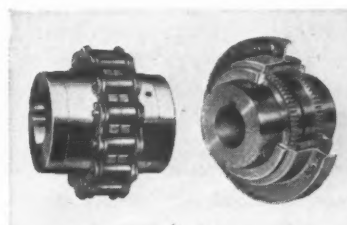
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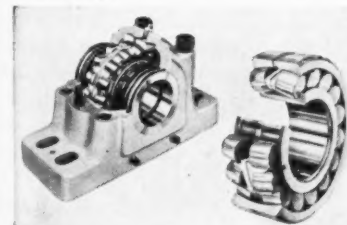
WORM GEAR SPEED REDUCERS—For high capacities, fan-cooled and Universal types, ratios to 3600:1; torque ratings to 135,000 pound inches, up to 150 hp.



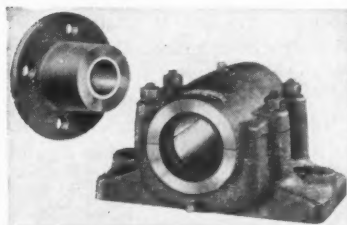
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POWER TRANSMISSION MACHINERY

15,383

LITERATURE ADVERTISED IN THIS ISSUE

Heavy Lifts that do not require special care or coddling. *Harnischfeger Corp.*
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Western Tool Show, conference, Nov. 14-18. *American Society of Tool & Mfg. Engineers.*
Page 24 Circle No. 19

"T-1" constructional alloy steel castings, engineering bulletin. *Alloy Steel & Metals Co.*
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New Guardrail for plant traffic. *Armco Drainage & Metal Products.*
Page 23 Circle No. 18

Roller Chains, 100 page catalog, 36 methods of chain adjustment. *Acme Chain Corp.*
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Cranes designed for unusual handling problems. *Cleveland Tramrail Div.*
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Compressed Air Equipment, custom-engineered. *Compressor Service Co.*
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Drives in nearly every hp rating. *R. & J. Dick Co., Inc.*
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Bearings, a broad line, widely distributed. *Dodge Mfg. Corp.*
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Automatic Riveters cut assembly costs. *Milford Rivet & Machine Co.*
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Motor Mount reduces bearing loads on a driven machine. *Falk Corp.*
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Lubricants, improve operation, reduce costs. *Lubriplate Div., Fiske Bros. Refining Co.*
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Foundry Machinery, a complete line. *Fernholtz Machinery Co.*
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Payloaders units, 20 models, 8 capacity ranges. *Frank G. Hough Co.*
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Rivets job designed for every industry. *John Hassall, Inc.*
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Conveyors for installation above or below ground. *Jeffrey Mfg. Co.*
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Power Transmission components, complete line. *Link-Belt Co.*
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Speed Reducers for limitless applications. *Morse Chain Co.*
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Finishing Equipment, from spray booths to complete systems. *Mahon-West.*
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Electric Hoists, new models in 1/2, 1 and 2 tons. *Chisholm-Moore Hoist Div.*
Page 84 Circle No. 55

Floor Trucks, casters, wheels. *Nutting Truck & Caster Co.*
Page 85 Circle No. 56

Quick Couplings, interchangeable with most popular makes. *Perfecting Service Co.*
Page 76 Circle No. 47

Ready-Power units assure full-time power for electric trucks. *Ready-Power Co.*
Page 99 Circle No. 62

Sheaves for light mechanical operation or heavy load control service. *David Round & Son, Inc.*
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Pallets for specific needs. Design service, technical data. *Select Pallet Co.*
Page 74 Circle No. 43

Insulating Materials for electrical-electronic products. *Tri-State.*
Page 98 Circle No. 60

Metal Hose catalog covers expanded line. *Universal Metal Hose Co.*
Page 75 Circle No. 46

Pumps, new, heavy-duty stainless steel. *Viking Pump Co.*
Page 102 Circle No. 65

ROTARY TABLE FEEDERS

Bulletin contains outline drawings, dimensions and specifications covering three standard feeders, each type specially designed for use in such areas as the foundry, mining, and pulp and paper industries. Also features selection procedures. *Chain Belt Co.*

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81 POWER TOOLS

Photos and condensed specifications of power tools for building and construction, mechanical trades, plant production and maintenance, and automotive use covers line of 81 tools. Featured in the presentation is a recently introduced reciprocating saw and roto-hammers. *Skil Corp.*

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SMALL BORE CYLINDERS

Catalog covers line of small bore air and hydraulic cylinders. Discusses design and construction features of the line. Also includes engineering, installation and maintenance data, schematics and cross section drawings of the cylinders. *Airoyal Mfg. Co.*

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PNEUMATIC CONTROLLERS

Bulletin describes new series of indicating pneumatic controllers in which a new advanced design control unit is featured. Specifications for the instrument are given, and models are listed for controlling pressure, liquid level, flow, temperature, and humidity. *Bristol Co.*

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HOLE PUNCHING AND NOTCHING

Catalog illustrates and describes line of hole punching units for punching up to 3-in. diameter round and shaped holes in up to 1/4-in. thick material. Also covers notching units for corner, edge, vee and shaped notches. *Punch Products Corp.*

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TOOL POSTS, HOLDERS

Brochure describes features of master tool posts and tool holders including advantages of giving greater rigidity, cutting set-up time in half and speeding machining time 30%. Outlines simplicity of design and operation as well as construction. General specifications are charted. *Rhucor.*

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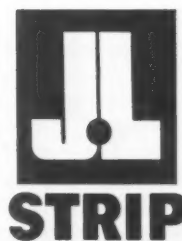
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SPRAYWELDER

Bulletin gives thorough description of a new model spraywelder unit and lists its advantages. Contains step-by-step outline discussion of spraywelder process and powders available for use with the new unit. Some typical applications are also listed and illustrated. *Wall Colmonoy Corp.*

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FURNACES FOR ALUMINUM

Booklet covers a new line of reverberatory melting furnaces for aluminum, designed for use in sand casting, die casting and permanent mold plants. Outlines advantageous features of the three new units, includes specifications, schematics as well as application photos. *Hevi-Duty Electric Co., Div. Basic Products Corp.*

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ASBESTOS-CEMENT SHEETING

A monolithic asbestos-cement sheeting that is highly resistant to physical and chemical abuse, yet provides a dense homogeneous surface, is described in this bulletin. Brochure describes the available thicknesses of the sheeting and contains recommended procedures for fabricating, bonding and cementing of the material. *Johns-Manville Corp.*

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MECHANICAL PRESS BRAKES

This 50-page illustrated book covers latest features and new models added to a line of mechanical press brakes. Specifications table includes machines from 160 to 1250 tons, mid-stroke capacity. Covers construction details, ram and bed designs, dies and punches, special presses, tonnage requirement tables and press performance illustrations. *Cleveland Crane & Engineering Co.*

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FACTS ABOUT PLASTICS

Brochure compares outstanding properties and typical industrial applications of 13 major plastic families in common industrial use. Five major misconceptions about plastics are discussed. Among plastics covered are: acrylic, nylon, teflon, polyethylene, flexible and rigid vinyl, cellulose acetate, butyrate, polystyrene, high and medium impact styrene and others. *Cadillac Plastic & Chemical Co.*

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THERMOCOUPLE WIRE

Catalog covers information on thermocouple wire and extension wire, bare and insulated. Includes chart showing basic characteristics of types of thermocouple wire insulation to cover temperature range from minus 190 to 2000 degrees F. *Minneapolis-Honeywell Regulator Co.*

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LAMINATED PLASTIC GUIDE

A handy selector-visualizer guide to a line of laminated plastic engraving stock for signs, name plates and specialty items. The pocket-size folder shows the nine colors and patterns stocked. Charts give information on finishes, thickness, sheet sizes and properties. *Formica Corp., Sub. American Cyanamid Co.*

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LUBRICATION BY SOLIDS

The theory and practice of lubrication by solids are the primary subjects of this 24-page booklet which discusses boundary friction and the role of solid lubricants to reduce friction and wear under heavy loads and at high temperatures. Describes and discusses major advantages of molybdenum disulfide solid lubricants. *Alpha-Molykote Corp.*

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LIGHT AND AIR DIFFUSERS

Catalog sketches the history and evolution of lighting and air distribution from the kerosene lamp and pot bellied stove, giving complete information on combination light and air diffusers. Includes data for selecting and predicting performance, and drawings showing how the new combination diffusers are installed and balanced. *Barber-Colman Co. and Day-Brite Lighting, Inc.*

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STOCK CYLINDERS

Brochure devoted to stock air and hydraulic power cylinders gives the strokes and dimensional data on line of cylinders. Includes 12 important benefits provided by the firm's stock cylinder program and describes variations such as rotated parts, rotated cushion adjustments, rod extensions, mixed mountings, and piston ring or teflon piston cup seals. *Flick-Reedy Corp., Miller Fluid Power Div.*

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SPECIAL CONTROL EQUIPMENT

Accessories and special control equipment catalog covers break-glass switches; control stations for mechanically held switches and relays; relay panels for gas valve; engine generator isolating switches; marine duty transfer switches and phase sequence correctors. *Automatic Switch Co.*

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CONVEYOR SYSTEMS

Catalog of continuous flow conveyor installations shows application photos of roller and wheel conveyors, belt and live roller conveyors, chain and elevating conveyors, sheet metal and roller spirals, portable power conveyors, ball transfer, special machinery and spring-mounted roller conveyors. *Mathews Conveyor Co.*

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REDWOOD SIDING ESTIMATOR

Pocket-size Redwood siding estimator for builders and specifiers is a time-saver in figuring siding costs and quantities. The slide-rule estimator shows the amounts of siding, in various nominal widths, needed for each square of wall coverage. Also computes the number of nails needed per square. *California Redwood Association*

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STEEL, CAST IRON COLLARS

Bulletin on shaft collars outlines complete specifications information on all sizes up to 4 15/16 in. bore diameter, including two new miniature sizes for 1/16 and 3/32 in. diameter shafting. Also explains and illustrates locking action of counter-clockwise knurl on cup point of screws fitted in the collars as well as an available self-locking screw. *Standard Pressed Steel Co.*

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STRAPPING CALCULATOR

Pocket-size strapping calculator computes the pounds of strapping needed for a given package size; figures total strapping necessary for a given production run; calculates cost per unit; computes the cost-per-foot for each strapping variety; and shows number of feet per pound and tensile strength for each stock size and kind of the firm's steel strapping. *Signode Steel Strapping Co.*

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SQUARE BARREL CYLINDER

A new line of air and hydraulic cylinders perfectly square on the outside with each of their four sides flush and flat, for unlimited mounting possibilities, is described in this bulletin. Outlines features and contains diagrams of seven universal mountings. *Galland-Henning, Nopak Div.*

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MULTIWALL PACKAGING GUIDE

Illustrated booklet contains information on the basic types of multiwall bags, the principal types of multiwall bag closures, proper storage and handling of the bags, railway car and truck trailer bag loading systems and multiwall packaging equipment. *Bemis Bros. Bag Co.*

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NEW LINE OF SHEAVES

A new line of multiple groove variable pitch sheaves are outlined in this catalog. Discusses advantages of the new introductions, the two types available, engineering data including overload service factors, a drive selection chart, use of companion sheaves and how to calculate a drive. *Browning Mfg. Co.*

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APC LIVE ROLLER CONVEYOR

An adjustable pressure conveyor (APC) that accumulates and conveys heavy, bulky, difficult materials efficiently and economically is described in this bulletin. Principles of adjustable pressure conveyor operation and their application to live roller conveyors are explained. Covers applications, types of materials, cartons and other containers for which the conveyor is suited. *Rapids-Standard Co.*

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CEMENTED CARBIDES

The wear resistance and abrasive qualities of cemented carbides is the subject of this special booklet. Includes details on design techniques, various sizes, properties, hardness, abrasion resistance and other data to help designers in the selection and application of the proper grade and in the design of wear parts and die components that will make the best use of cemented carbide's properties. *Allegheny Ludlum Steel Corp.*

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SAFETY TOOLS

The more popular items of a safety tool line are illustrated in this brochure which lists and describes such tools as wire brushes, hammers, scrapers, pliers, shovels and wrenches. Discusses the non-sparking, non-corrosive qualities of the tools. *Ampco Metal, Inc.*

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HEAVY DUTY PILLOW BLOCKS

New heavy duty pillow blocks, with self-aligning spherical roller bearings in split housings, are the subject of this catalog. Describes the two series available in 143 sizes. Covers design features, calculated bearing life and a guide to lubrication of spherical roller bearings. *Torrington Co.*

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ELECTRIC MOTOR CONTROLS

Handy 56-page pocket catalog of electric motor controls. Includes descriptions and ratings for manual and magnetic starters, drum controllers, pressure, foot and limit switches. Also covers push buttons and related pilot devices. Motor rating and heater coil data, plus tables simplify control selection. *Furnas Electric Co.*

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PACKAGED AIR CONDITIONERS

Bulletin describes line of packaged air conditioners, including performance characteristics and engineering features. Typical installation photos show units with and without discharge plenum to illustrate a discussion of owner advantages of the packaged units. A ready-reference table provides physical data and indicates the range of capacities available. *American-Standard Industrial Div.*

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PUMPING DATA

Cost of electrical pumping, how to survey a deep well, and methods for testing pumps are some of the helpful facts contained in this pump manual. Presents data on how to figure NPSH, pump efficiency, mechanical and electrical equivalents and a pipe friction loss chart. Includes a Weir table, orifice charts of pipe and friction loss charts. *Peerless Pump, Hydrodynamics Div., Food Machinery & Chemical Corp.*

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WASHABLE TRACING FILM

A new process of restoring the printability of original tracings simply by washing them with soap and water is described in this bulletin. Explains advantages of the special washable film and special pencil used, including a sample for a do-it-yourself test. *Keuffel & Esser Co.*

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SPECIAL CUTTING TOOLS

New 45-page catalog of special cutting tools includes plain milling cutters, light and heavy; helical milling cutters; side milling cutters, staggered tooth, half side, interlocking; metal splitting saws, hollow ground, side chip and staggered teeth. Includes illustrations. *F & D Tool Co., Inc.*

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FIBRE CONTROL TAPE

Fibre control tape for machine tool control and data processing applications is the subject of this bulletin. Discusses advantages of the fibre tape, physical properties and specifications. Also contains complete information on quantities, sizes and colors available. *National Vulcanized Fibre Co.*

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THROWAWAY INSERT FACE MILLS

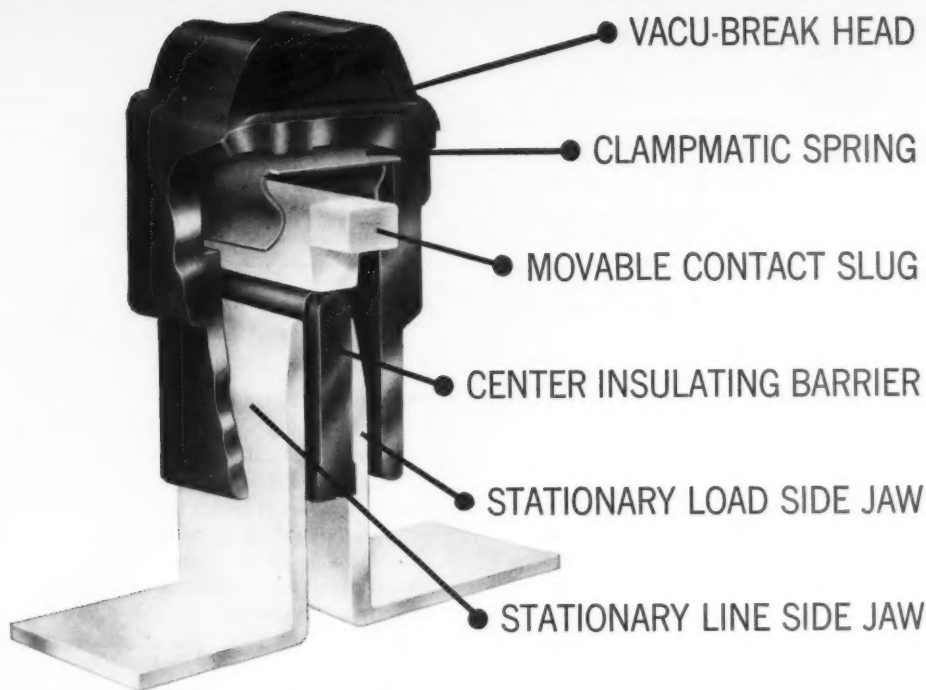
Nearly 500 throwaway insert milling cutter styles and sizes are listed in this new catalog. Covers complete line of cutter bodies, cartridges, inserts and accessories for milling cast iron, steel, aluminum and nonferrous metals. Illustrates cutter body and cartridge details; insert shapes, lead angles and rakes; standard drive dimensions and accessory details. *Valenite Metals, Div. Valeron Corp.*

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SPEED VARIATOR

Detailed information on a high performance speed variator which uses Thyristor tubes to convert a-c to d-c power is contained in this booklet. Describes the adaptability of the drive to machine feed and spindle applications, reeling equipment, conveyor systems, processing equipment, textile machines and others. Covers standard features and modifications possible for specific needs. *General Electric Co.*

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INCREASED SWITCH LIFE WITH CLAMPED PRESSURE CONTACT AND VACU-BREAK ARC CONTROL

You get longer switch life from Bulldog safety switches, thanks to unique Bulldog design. The high-tension Clampmatic® spring puts pressure where it belongs—on contact faces after the switch is "ON." This clamped pressure action assures good electrical contact for the life of the switch. It means the switch lasts longer, too, for there's no overheating to damage switch components. In switching "OFF," the pressure's removed before the "break" . . . providing true quick-break action.

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Vacu-Break arc control plus clamped pressure contacts add up to long switch life . . . and dependable, economical service for you. You'll find Bulldog safety switches need little or no maintenance over years of heavy-duty use. See your Bulldog products distributor.

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I-T-E CIRCUIT BREAKER COMPANY**

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SPECIAL MANUALS

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VALVES AND FITTINGS

Safety and Relief Valves

This 144-page manual discusses functions of a safety and a relief valve, covers research and quality control, valve operation and design of a line of bronze, iron and steel valves. Complete technical data, selection charts. *Manning, Maxwell & Moore, Inc.*

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High Temperature, Corrosion Proof Hose Assemblies

A Teflon compound hose designed to meet the more severe service conditions encountered in jet engines is the subject of this brochure. Discusses construction features, charts severe hose test results, method of attachment and advantages for industrial use. *Resistoflex Corp.*

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Valves with Lasting Trim

Booklet shows how many prominent manufacturers are using Nickel alloys for valves and valve trim, the problems they overcome and service life gained. Includes case histories of performance under severe conditions. *International Nickel Co., Inc.*

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Solenoid Valves

Descriptive literature about a midjet packless solenoid valve, two-way normally closed for one-eighth inch pipe using air, water, oils or gases. Discusses construction, features, operation and includes specifications. *C. A. Norgren Co.*

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Spool Valves

Brochure describes the unlimited versatility of line of two, three and four-way spool valves for air and low pressure hydraulics. Illustrates the interchangeability of the four-way spool valve with all operators. Includes installation data. *Automatic Valve Co.*

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Plastic Pipe Fittings

Brochure sets forth the advantages of plastic pipe and gives size and type of nipples, clamp saddles, tees, couplings, saddles, various ells, male and female adapters, caps, plugs, flanges, reducer bushings among other of the 2,000 different type of fittings available. *Sloane Mfg. Co.*

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Copper Tube Fittings and Valves

Comprehensive 112 page manual contains not only a detailed listing of the sizes and solder joint fittings available for copper tube plumbing, but also gives detailed roughing-in dimensions which are of special value in the engineering of plumbing layouts in plants or commercial structures. Section on cast-brass valves covers low pressure, compact and husky patterns, various pressure ratings and flared tube. *American Brass Co.*

... FOR YOUR COPY, CIRCLE NO. 206

Stainless Pipe, Valves and Fittings

Bulletin outlines pipe in a wide range of alloys and sizes: gate, globe, check, angle, "Y", needle and diaphragm valves in many alloys and sizes. Also covers a complete range of fittings types, sizes and alloys. Includes seamless and welded pipe sizes. *Electric Steel Foundry Co.*

... FOR YOUR COPY, CIRCLE NO. 207

Regulators

Catalog covers line of high pressure and large volume regulators. Includes loaders, gas dome regulators, single-stage and two-stage spring loaded regulators as well as a miscellaneous group. Charts flow curves. *Victor Equipment Co.*

... FOR YOUR COPY, CIRCLE NO. 208

Cylinder Valves for High Pressure Gases

A complete line of cylinder valves for many types of compressed gases is outlined in this brochure. Discusses advantages and charts specifications. Also describes an acetylene valve, including specifications. *Air Reduction Pacific Co.*

... FOR YOUR COPY, CIRCLE NO. 209

Guide for Selecting Valves

Easy-to-use thumb indexed valve selector groups valves according to steam pressure ratings. Water, oil and gas rating are also given. Covers complete line of valves and illustrates application of boiler mountings conforming to ASME Boiler Code. *Lunkenheimer*

... FOR YOUR COPY, CIRCLE NO. 210

Valves for Heating, Piping and Air Conditioning

Condensed catalog of line of bronze and iron body valves specially designed for heating, piping and air conditioning systems. Covers features, specifications and photos of bronze and iron body gate, globe and check valves. *Fairbanks Co.*

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Valve Featuring Short Poppet Travel

Bulletin about a line of short poppet travel valves that provide maximum flow almost instantaneously. Discusses advantages of this feature as well as other outstanding advantages of the line. *Bellows-Valvair Corp.*

... FOR YOUR COPY, CIRCLE NO. 212

Tube Fittings for Instrumentation

Flareless type tube fittings especially for instrumentation, pilot, air, water, lube or coolant lines are described in this catalog. Covers tubing materials, how to use, pressure rating, threads and complete product data. *Parker-Hannifin Corp., Fittings and Hose Div.*

... FOR YOUR COPY, CIRCLE NO. 213

Hose and Fittings

Catalog covers a line of industrial hose assemblies, hose, reusable fittings, self-sealing couplings and adapters. Gives construction information and application of wide selection of hose types including socketless, single and multiple wire braid, spiral wrap and hose of teflon. Includes hose selector chart and hose assembly instructions. *Aeroquip Corp.*

... FOR YOUR COPY, CIRCLE NO. 214

Straight-Flow Control Valve

The principal advantages and the principle of operation of this recently introduced straight-flow control valve are explained in this illustrated brochure. Describes outstanding ability of valve to throttle a flow with great delicacy and yet open into a straight through path when fully opened. *General-American Valve Co.*

... FOR YOUR COPY, CIRCLE NO. 215

Saunders Type Valve for Gases, Corrosives

The exclusive features of an electric motor hydraulically actuated Saunders type valve especially suited for handling of gases, corrosive fluids, and suspended solids are outlined in this brochure. Discusses outstanding features, specifications, and diaphragm material recommendations. *General Controls Co.*

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Liquid Relief and Special Service Valves

Catalog illustrates and describes complete line of safety-relief valves for marine and fire pump service, hydraulic pressure systems, liquified gases, chemical corrosive and general industrial service. Includes sizing data, capacity tables, weights, dimensions, and application data. *Farris Engineering Corp.*

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Device for Controlling All Types of Valves

Manual describes LimiTorque Control, a sensitive, automatic, power actuated device for controlling all types of valves, sluice gates and shipboard water tight doors. Explains what LimiTorque does; outlines, pictures and describes various types of valve controls available. *Philadelphia Gear Corp.*

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Lubrication Fittings

Catalog covers line of lubrication fittings from pin type to hydraulic type, including fittings which have been developed for many special purposes such as relief, measuring, and drive fittings. *Alemite Div., Stewart-Warner Corp.*

... FOR YOUR COPY, CIRCLE NO. 219

Poppet-Type Air Control Valves

Spiral-bound manual covers complete line of poppet-type air control valves, discusses features, J. I. C. conformance, operation, construction, maintenance and important feature of parts interchangeability. *Galland-Henning, Nopak Div.*

... FOR YOUR COPY, CIRCLE NO. 220

Welding Fittings and Flanges

Welding fittings and flanges for all types of piping and process equipment are the subject of this newly released brochure. Includes dimensional tolerances of butt-welding fittings; threaded, slip-on, lap joint and blind flanges and welding neck flange. Pictures types of fittings and charts sizes. *Babcock & Wilcox Co., Tubular Products Div.*

... FOR YOUR COPY, CIRCLE NO. 221

Diaphragm Control Valves

Series of six bulletins give full information on line of diaphragm control valves. First bulletin describes series 1000 for on-off or proportional control of moderately difficult processes. Series 1850 covers a forged steel body, needle port valve for high-pressure service requiring high pressure drop and small flow. *Bristol Co.*

... FOR YOUR COPY, CIRCLE NO. 222

Electrically Operated Valves

Bulletin describes line of two, three and four-way electrically operated valves for air, inert gases, petroleum, vegetable oils, water, gasoline, kerosene, freons and other uses. Includes valve descriptions, specifications, flow data, flow charts, coil and seal data and optional features. *Airmatic Valve, Inc.*

... FOR YOUR COPY, CIRCLE NO. 223

Valve For Presses, Machines With Air Clutches

Bulletin devoted to a line of protector air valves designed to provide safe and dependable control for air clutches, brakes, combination clutches and brakes, or other air operated devices. Most common application is on presses, shears, press brakes or press welders. *Clark Controller Co.*

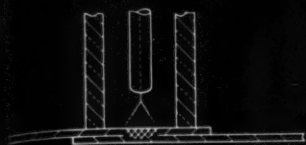
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Ball Valves

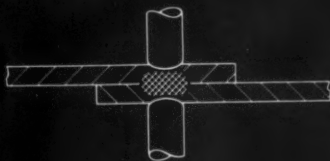
Basic advantages of a line of ball valves, special design features, and performance are covered in this 37-page catalog. Includes dimensions, pressure, temperature chart, remote control operators. Engineering section covers metals, seal materials, vacuum and throttling service and a corrosion guide. *Pacific Valves, Inc.*

... FOR YOUR COPY, CIRCLE NO. 225

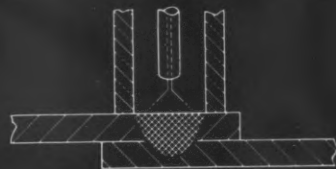
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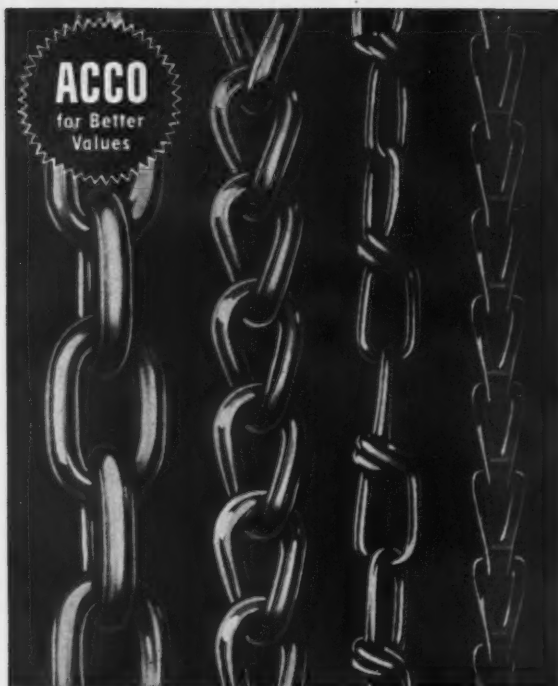
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68

Radiator Valves

Included in this catalog of steam traps, temperature regulators and heating specialties is complete data on valves for steam and hot water. Covers technical information and product description. *Sarco Co., Inc.*

... FOR YOUR COPY, CIRCLE NO. 226

Valve Materials

Catalog includes description of plug valves made of aluminum bronze for efficient performance under severe conditions resulting from corrosive, erosive, cavitating or abrasive attack. Lists sources for obtaining a wide variety of valves of Ampco alloys. *Ampco Metal, Inc.*

... FOR YOUR COPY, CIRCLE NO. 227

Two, Three and Four-Way Solenoid Valves

Resume of line of solenoid valves. Covers two-way for automatic control of the flow of liquids and gases, three-way for pilot control of diaphragms or cylinders and four-way generally used to operate double acting cylinders. *Automatic Switch Co.*

... FOR YOUR COPY, CIRCLE NO. 228

Automatic Valve Lubricating System

An automatic lubricator for lubricated valves is described in this booklet which covers the construction of the lubricator, tells how to install and operate it, and gives information necessary for the device's adjustment. *Rockwell Mfg. Co.*

... FOR YOUR COPY, CIRCLE NO. 229

Valve Catalog

Operating specifications, characteristics, sizes, ratings and illustrations of a line of valves are presented in this catalog. Includes iron and forged steel gate valves, bronze and iron globe and angle valves; bronze and iron check valves, asbestos packed iron cocks, bar stock valves and accessories. *R-P&C Valve Div., American Chain & Cable Co.*

... FOR YOUR COPY, CIRCLE NO. 230

Thermoplastic Ball Valves for Corrosives

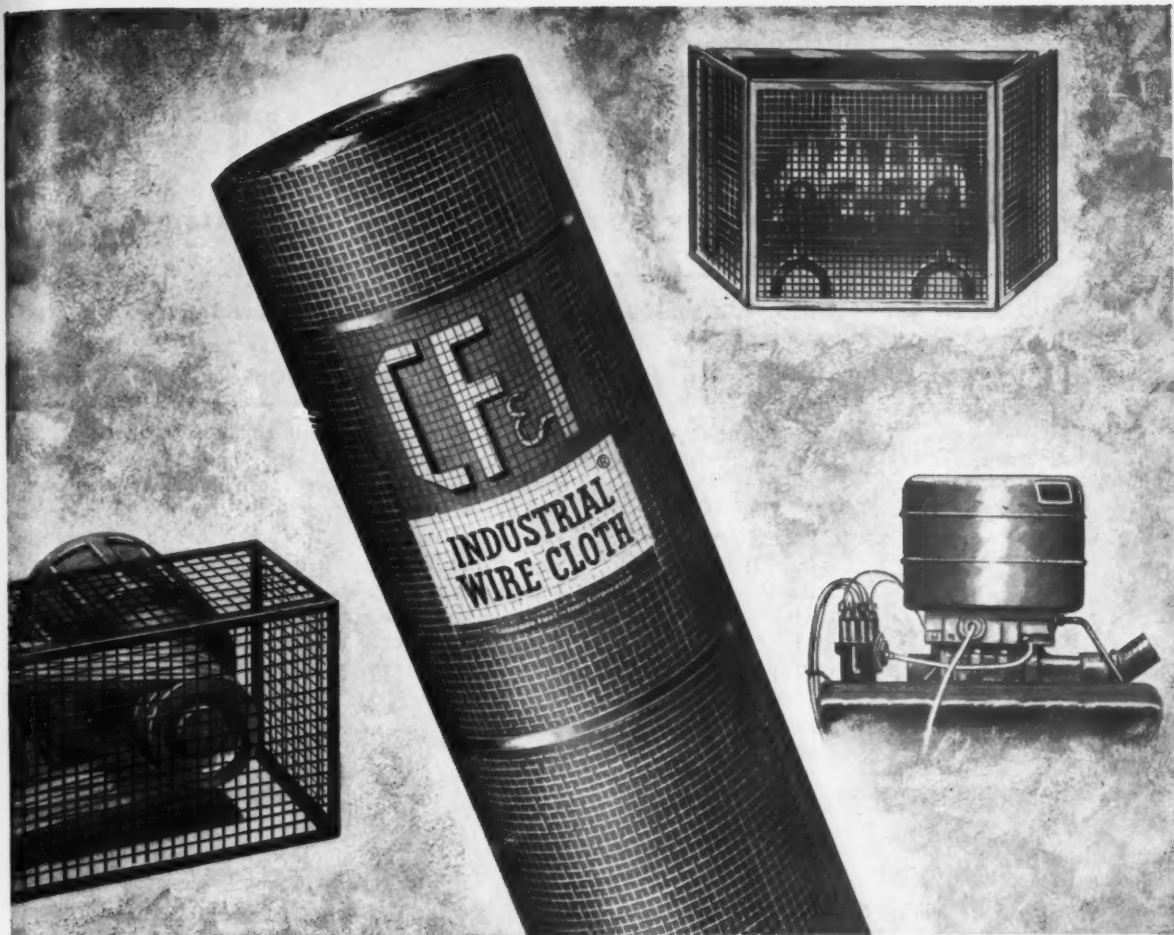
New top-entry, top-adjusting thermoplastic ball valves made of unplasticized polyvinyl chloride or chlorinated polyether are described in this bulletin. Discusses corrosion-resistance characteristics and on-the-line maintenance features. Gives dimensions for threaded, socket and flanged-end type valves in 1/2 through 2 in. normal pipe sizes. *Tube Turns Plastics Inc.*

... FOR YOUR COPY, CIRCLE NO. 231

Valves for High Pressures and Temperatures

Features of a special line of alloy valves for pressures up to 6000 psi and temperatures as high as 1085 degrees are outlined and discussed in this bulletin. Covers materials used in the forged steel valves, typical installations and temperature pressure ratings of cast chrome-moly steel valves. Also materials used in cast steel valves. *Yarnall-Waring Co.*

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CF&I INDUSTRIAL WIRE CLOTH...

the product with a hundred-and-one uses

In today's plants and factories there is a steady need for top quality industrial wire cloth. CF&I's precision manufacturing techniques assure a strong, rigid steel industrial wire cloth that retains its square, even mesh through a long service life.

CF&I Industrial Wire Cloth is a product with a hundred-and-one uses: as integral parts of end products such as strainers and reinforcing for gasket material; filter cloth, window or machinery guards, screens for accurate sizing of various materials.

Made in a wide range of mesh sizes and types of weave, CF&I Industrial Wire Cloth is fabricated in carbon and stainless steels, aluminum, brass, copper, Monel and other alloys.

For prompt delivery or complete information on wire cloth "made to order", contact the nearest CF&I sales office.

When ordering, specify wire cloth by type of metal, type of weave and mesh size to get the one best suited for your use. A CF&I representative will be glad to assist you in selecting the proper specification.



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NEW EQUIPMENT

FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE



USE RIP OUT POSTCARD, PAGE 86, FOR MORE INFORMATION ON PRODUCTS DESCRIBED

RESIN PROCESSOR

... facilitates handling of epoxy and polyurethane compounds



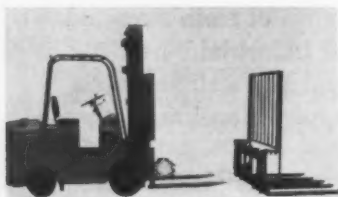
This newly developed unit will proportion, dispense, and mix multi-component reactive resins. It simplifies the use of two part epoxy and polyurethane compounds. Proportional accuracy of the two component media dispensed is maintained through mechanical

linkage operating positive displacement pumps. Thorough blending of the resin mix is accomplished by a powerful motorized mixer. The teflon impeller is the only part of the processor which enters the reactive resin mix. There are no cleaning or purging problems as it is impossible for this equipment to freeze up. Short pot-life resin mixes can be handled with ease and safety. *CPM Special Machinery Corp.*

... FOR MORE DETAILS, CIRCLE NO. 300

CARTON HANDLING LIFT TRUCK

... can accommodate loads of varying widths



This Model 540 lift truck is especially equipped for carton handling without palletization. A special 82-in. 5-fork carriage allows the bottom row of cartons to act as a pal-

let by opening the carton lids. The two end forks have a 6 in. offset left to right to fit loads of varying widths. The five forks are attached to an oversize 82 x 76 in. high backrest for handling extra high loads. Positioning racks adjust the backrest into four different positions for loads of various heights. The special backrest and carriage accessory is easily removable and interchangeable with a standard 2-fork carriage. The model is also equipped with a sideshifter attachment with which the operator may shift loads laterally on the forks. An optional triple lift mast is used for stacking onto tiers up to 12 ft. high. Dual drive tires are used for maximum stability during heavy handling operations. *Towmotor Corp.*

... FOR MORE DETAILS, CIRCLE NO. 301

CORROSION RESISTANT COUPLINGS

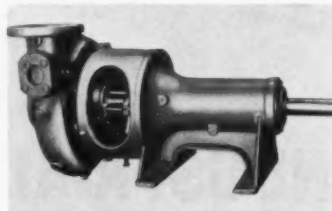
... quick disconnects protected by electroless nickel plating

A new method of protecting quick disconnect couplings with electroless nickel plating has been introduced for greater economy. The electroless nickel plating on the coupling is free of voids and conformity to the surface is so excellent that there is no observable void between the coating and the base material. Coating adhesion is excellent with reported values in the order of 30,000 and 60,000 psi. The couplings are now used in conjunction with nuclear reactors, process chemical applications, petroleum refining and missile fueling. *Snap-Tite, Inc.*

... FOR MORE DETAILS, CIRCLE NO. 302

NEW PUMP LINE

... each pump NEMA-matched to align with NEMA-rated motors



A new line of centrifugal pumps, designed to furnish a wider range of clear water, non-clog and other liquid modifications, has been announced. Featured innovation

of this new line is the fact that each pump is NEMA-matched; thus, the pump dimensions align with those of NEMA-rated motors for ease of mounting and trouble-free operation. The pumps are constructed so that the pump frames receive various size volutes and impellers so that each individual pump becomes, in effect, the equivalent of several individual units. The standardization with NEMA motor frame dimensions allows installation without makeshift height-adjusting blocks and odd-bore couplings. *Fairbanks, Morse & Co., Pump & Hydraulic Div.*

... FOR MORE DETAILS, CIRCLE NO. 303

DUAL PURPOSE TRUCK

... for high ladder maintenance and stock picking use

Double utility and safety are combined in this new all-aluminum alloy, flat bed, ladder truck. The 66 in. high top step ladder with extension work tray makes truck ideal for heavy stock picking and maintenance up to 12 ft. Safety approved spring-loaded ladder locks to floor under operator's weight and retracts when weight is removed. Truck is easy to maneuver in restricted space on ball bearing, rubber tired wheels. The truck weighs approximately 130 lbs. and has a 2000 lb. capacity. *Rol-Away Truck Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 304

This Jeffrey Conveyor (Rope Belt Type) is VERSATILE

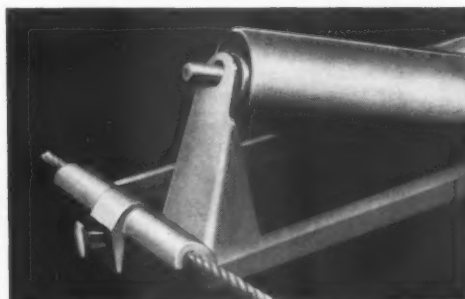
Install it above or below ground—to handle coal, salt, gypsum, ore, clay, shale, sand, gravel and other materials. You'll find it surprisingly low in first cost and easy to install. Easy to relocate, too.

Belts last longer on these Jeffrey rope type belt conveyors, because of the spring action of the flexible supports as loads pass over troughing idlers. And the Permaseal Idlers are sealed to keep out dirt; prelubricated for years of maintenance-free operation.

For bulletin containing detailed information on these conveyors, write The Jeffrey Manufacturing Company, 920 North Fourth Street, Columbus 16, Ohio.



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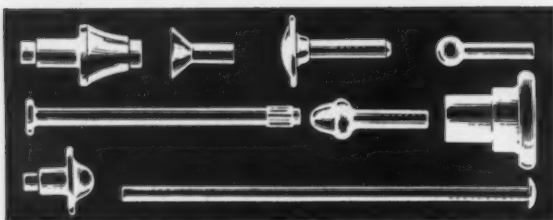


This clamp with tapered locking pin makes it easy to relocate idlers. Note how Permaseal® Idlers are sealed against dust and dirt.



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PERSONAL RADIO PAGING SYSTEM

... capable of selective voice communications to 7500 persons

A new system, which operates on standard mobile radio VHF frequency bands (25-54 mc and 144-174 mc) enables one-way communications between a central base station and individuals carrying compact "handie-talkie" radio paging receivers. When an individual is paged, an alerting tone sounds in his receiver. The voice message follows. Private communications are maintained since no other paging receiver is alerted. The fully transistorized FM receiver provides 500 milliwatts audio output, enabling reception even in noisy locations. The radio pager operates from either a rechargeable battery or mercury cells. The rechargeable nickel cadmium supply provides up to 12 hours operation with each charge. The replaceable mercury cells last up to 120 working hours. The entire receiver weighs only 14 ounces and fits easily clipped in a pocket or on a belt. *Motorola Inc.*

... FOR MORE DETAILS, CIRCLE NO. 305

AUTOMATIC WIRE TYING MACHINE

... for bundling, closing cartons or wooden boxes



A new conveyor-fed wire tying machine for the automatic high-speed bundling of newspapers, catalogs and other publications, and for the reinforcing and closure of corrugated cartons and wooden boxes has been announced.

The machine uses 13

to 18 gauge round steel strapping and can make up to 26 ties a minute with a 3½ twist tie. It will handle packages from two to 23 in. high and eight to 36½ in. wide. Micro switch controls and a powered conveyor table permit packages to be fed automatically into the machine, compressed top and sides, strapped to a pre-set tension and moved off onto a live roll, gravity roll or belt conveyor. The feed-in conveyor moves at a rate of 14 inches per second to position packages for tying. *A. J. Gerrard & Company*

... FOR MORE DETAILS, CIRCLE NO. 306

PLASTIC CLAMPS

... Polypropylene, loop type, for diversified application

A new line of plastic clamps made of Polypropylene have been introduced that have a high tensile strength and great rigidity; excellent dielectric properties, even at high frequencies, and also resist solvents, grease, oil, many common acids and chemicals. Available in seven sizes from ¼ in. to ½ in. in diameter, they are molded to assure uniformity in size and shape and all edges are round and smooth for protection against vibration, strain and pulling. The clamps may be used as a wire and cable clamp, transformer lead clip, strain relief, tube and pipe hanger. There are many diversified applications in electronics, electrical wiring, communications, machinery, appliances and lighting equipment. *Holub Industries*

... FOR MORE DETAILS, CIRCLE NO. 307

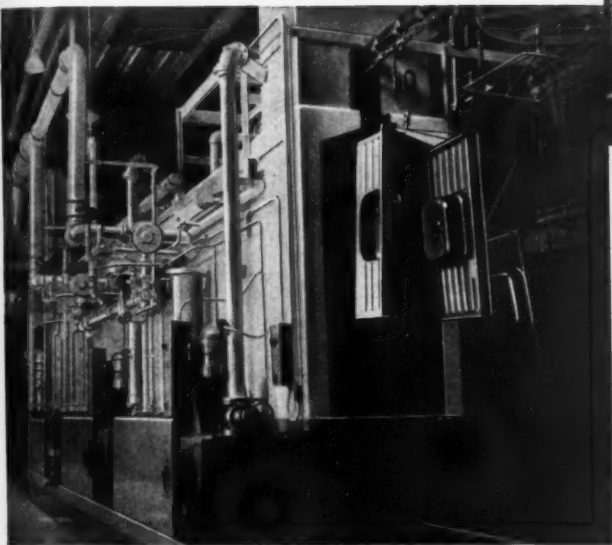
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have your

Mahon finishing equipment



from spray booths
to complete systems

...built in a West Coast plant



MAHON . . . the acknowledged leader in metal-cleaning and metal finishing equipment . . . is now geared to economically supply your equipment needs from a local source. The new manufacturing plant of Mahon's Western Operation at Torrance, Calif., is now in operation and is backed by unmatched staff engineering specialists in the finishing and allied field. This unique tie-in means cost savings, time savings, better service and the best in finishing for the manufacturing industries of the Pacific area.

Many companies have learned that improved finishing often means the easiest . . . and most economical . . . product improvement they ever made. New developments make improvement possibilities more pronounced. But, for maximum benefit the choice has to be Mahon—their experience is your surest safeguard and biggest value. Write the Western Operation for descriptive literature.

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Ovens • Dust Collectors and Fog Filters • Automatic Conveying Systems • Special Plant and Production Equipment

CONSTRUCTION SERVICES • Structural Steel-Fabrication and Erection • Steel Fabrication—Weldments

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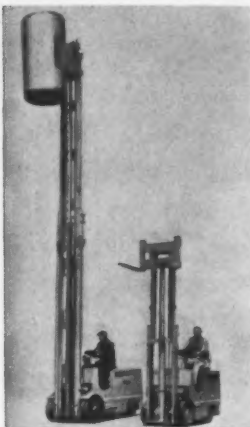
Mahon-West Sales-Engineering offices at
2600 Monterey St., Torrance, Calif.
and 821 Market St., San Francisco.

MAHON

... for more details, circle No. 42 on Reader Service Postcard

HIGH LIFT MAST

... features a displacement-type cylinder



Use of a displacement-type cylinder in the design of this extra high lift mast provides greater strength with the same effective area as piston type cylinders used with trucks having lower lift heights. Lift cylinders on both trucks have same effective diameter although high lift model will lift a 5,000 lb. load 28 ft. while the standard can hoist 5,000 lbs. only 12 ft. Line is adaptable to Yale 51 series up to 10,000 lb. capacity. Yale & Towne

... FOR MORE DETAILS, CIRCLE NO. 308

EPOXY RESIN ADHESIVES

... cure at room temperature under contact pressure

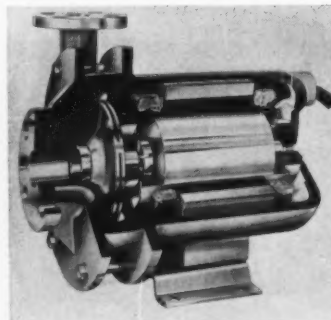
Three new two-component modified epoxy resin adhesives that cure at room temperature under contact pressure are now available for high strength metal and plastic structural bonding applications where heat and/or pressure are not feasible in the bonding operation. All 3 adhesives maintain high strength properties over a service temperature range of minus 67 to 160F. Shear strengths of metal to metal assemblies bonded with these adhesives range from 2300 to 3200 psi at 75F service temperature. They have high creep resistance under constant stress, exceptional adhesion to metals and plastics and good resistance to water, hydraulic oil and aromatic fuels. Their excellent self filleting properties makes them extremely useful for honeycomb sandwich construction. The paste type con-

sistency of these adhesives provides excellent void filling properties which permit the structural bonding of loosely fitting parts. The adhesives will cure to maximum strength in approximately 7 days. If desired, a more rapid cure can be obtained by merely heating the adhesive bonded assembly in an oven, under infra-red lamps or by dielectric or induction heating. These two-component modified epoxy adhesives consist of a base resin and a separate liquid curing agent. The two materials are mixed in the proper proportions just prior to use. As soon as the two parts are mixed the curing reaction begins. *Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 309

LEAK-PROOF CANNED PUMPS

... for handling of dangerous or expensive fluids



This newly introduced unit is a completely self-contained motor pump in which the material being handled circulates within the motor. The pump impeller is connected directly to the motor shaft. Thus, no seals, packing or stuffing box are re-

quired and the pump is completely leak-proof. The motor rotor and field are encased in stainless steel "cans," heliarc welded during fabrication to isolate them from the material being pumped. The pumped fluid lubricates the entire unit. Every wettable part of the pump, except the Graphitar bearings, is made of 316 stainless steel, assuring sanitation and corrosion resistance. *Robbins & Myers, Inc.*

... FOR MORE DETAILS, CIRCLE NO. 310

<p>TIER-RACK A portable racking system for completely elastic storage.</p>	<h1 style="text-align: center;">SELECT PALLET CO.</h1> <p style="text-align: center;">Manufacturers and Distributors</p>			<p style="text-align: center;">PALLET SPECIALISTS</p> <p>Since we offer ALL types of pallets, we are free to recommend THE pallet which is best suited for your specific needs.</p>
<p>ARKANSAS HARDWOOD More economy thru longer life and greater strength.</p>	<p>GLUE-NAIL PLYWOOD Dimensionally stable, smooth surfaces. DFPA engineered.</p>	<p>DOUGLAS FIR An inexpensive pallet with specially selected edge-boards. NWPMA grade marked.</p>	<p>PALLET DOLLIES The helping hand in a busy warehouse (your spare pallet transporter)</p>	<p style="text-align: center;"><i>also</i> Skids Cut Lumber Bin Pallets</p>
<p style="text-align: center;">Over 10 years experience in the construction and engineering of PALLETS for major industries.</p>				
<p style="text-align: center;">Call us for FREE DESIGN SERVICE • FREE TECHNICAL DATA ...</p>				
<p style="text-align: right;">SELECT PALLET CO. 4085 SHEILA STREET LOS ANGELES 23, CALIF. TELEPHONE ANGELUS 9-9418</p>				

... for more details, circle No. 43 on Reader Service Postcard

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<p>SACRAMENTO 14 1009 Jay Street Phone GIlbert 1-1407</p>	<p>SAN DIEGO 1450 - 7th Avenue Phone BElmont 2-9113</p>	<p>PHOENIX, ARIZONA 3018 Central Avenue Phone AMherst 6-8448</p>

... for more details, circle No. 44 on Reader Service Postcard

INSTANT NICKEL CHLORIDE

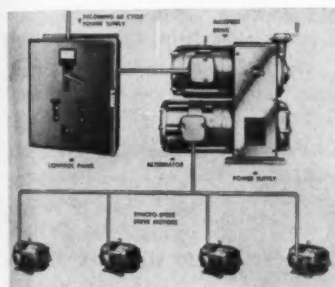
...now available in liquid form, makes easier handling

A new instant liquid nickel chloride has been introduced that can be advantageously used in place of dry nickel chloride. It offers three advantages over the dry material; eliminates dissolving problems, ease in handling and better storage. Because of the liquid nickel chloride's miscibility, tedious dissolving problems are completely eliminated. The solution requires no stirring or pre-mixing. Platers need only pour the required amount into the plating bath to bring the nickel chloride content up to proper level. One gallon of the nickel chloride contains the equivalent of six lbs. of the dry material. The material weighs 11.75 lbs. per gallon, net. It is packaged in 50 gallon steel drums with a special corrosion resistant liner. *Hanson-Van Winckle-Munning Co.*

... FOR MORE DETAILS, CIRCLE NO. 311

SYNCHRONOUS RANGE DRIVES

...sizes 2 to 15 hp; for continuous process machines



Synchronous range drives that provide adjustable speed of synchronous induction motors running in exact synchronism over a wide range of speed have been introduced. The Synchro-Range-Drive is an integrated system

consisting of an adjustable frequency power supply, one or more synchronous drive motors, and a control panel. Adjustable frequency power is supplied from an AC alternator driven by a constant speed squirrel cage induction motor which provides adjustable speed through the mechanical interaction of adjustable discs and a ribbed belt. By adjusting the power supply output, the drive motors can be varied in speed, maintaining exact synchronism of all motors at any fixed speed and also while increasing or decreasing speed. Control panel includes alternator field supply. Designed for operation of multi-unit conveyors; textile or paper printing or finishing, synthetic fibre spinning, drawing or twisting; metal run-out tables; and other similar machines which require application of power at a number of points on machine. *Louis Allis Co.*

... FOR MORE DETAILS, CIRCLE NO. 312

POWER SWEEPER

... covers more than 40,000 sq. ft. per hour

A redesigned and improved power sweeper for industrial usage has been announced. Compact and maneuverable, the new model sweeps congested areas, warehouse aisles, parking islands with ease, taking the place of 10 men using outmoded pushbroom methods. Basic improvements include a new, larger 5 3/4 hp engine; a larger muffler reduces engine sound level 50%; exhaust gases are diffused by deflection plate, making operation cleaner and safer; and externally mounted oil filled air cleaner provides a constant supply of cool, clean air to the engine, resulting in longer engine life. *Wayne Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 313

*A Complete New Service
for You . . .*

STAINLESS STEEL CASTINGS

- . . . Pouring free machining stainless steel to help cut your machine time
- . . . To meet your most exacting specifications
- . . . From the West's newest and most modern stainless steel foundry

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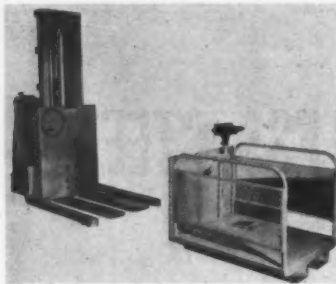
NEW! LARGER!

Universal
METAL HOSE CATALOG!

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... for more details, circle No. 46 on Reader Service Postcard

NARROW AISLE RIDER TRUCK

... with removable, rider type remote control platform



The development of a quickly removable, rider-type, remote control platform that can be used to operate a standard narrow aisle, high stacking Model "MN" Aisle-Master, adding a new dimension to order picking equipment, has been announced. A full set of controls for steering, lifting, lowering and driving in forward and reverse are located on the rider type, remote control platform. This provides a versatile combination allowing the operator to use a standard "MN" narrow aisle truck for regular right angle stacking operations or by attaching the special platform the operator can ride up to storage areas to remove or deposit goods in order picking situations. *Lewis-Shepard Products, Inc.*

... FOR MORE DETAILS, CIRCLE NO. 314

FIBER GLASS DUCT LINER

... features better performance, low fire hazard rating

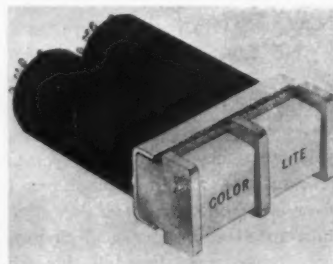
A new fiber glass duct liner, micro-bar, with an exceptionally low fire hazard rating and featuring "dual density" construction for better performance in air conditioning and

heating duct systems is being introduced. The new liner, in 1/2, 1, 1 1/2 and 2-in. thicknesses, is a resilient, semi-rigid insulation blanket of strong, fine glass fibers bonded by a thermosetting resin. It is made up of two different densities of insulation, each serving an essential function. The black colored surface is made of heavy density fiber glass for resistance to the high air velocities of up to 5,000 ft. per minute encountered in modern duct systems. Its toughness, company engineers point out, makes it easy to form integral nosings at the leading edges when the material is being installed in ducts. This eliminates complicated and costly metal holding strips and metal nosings that dissipate heat. The new type nosing, made of the material itself, is secured with the same type of pin or fastener used to hold the balance of the insulation in position. Underneath the heavy density surface is the light density portion, amber in color, which provides better sound absorption and overall thermal performance. The 1/2-in. material has a noise reduction coefficient of .60, the 1-in. material has a .80 NRC. Underwriters' Lab has given the new product the following fire hazard classification; flame spread 15; fuel contributed 25; smoke developed 5. *Johns-Manville*

... FOR MORE DETAILS, CIRCLE NO. 315

LIGHTED PUSH BUTTON SWITCH

... for use wherever an indicating device is required



A new, lighted push button switch, available single pole to six poles, double throw or single throw, has been announced. For dry circuit to 3 amps operation, the switch is designed for use in computers, data

and message handling, missile ground support equipment, machine tool control and process control. A proven design, it combines in a single unit, a control switch and an indicator light in the push button, and utilizes standard, midget flange, single contact bulbs #327, 328, etc. The switches mount on one in. centers, either horizontally or vertically. *Sloan Co., Color-Lite Div.*

... FOR MORE DETAILS, CIRCLE NO. 316



The high sign

"WHERE Good Connections COUNT"®

The PUSHOMATIC Interchangeable Quick Coupling is interchangeable with most all popular makes and at the same time smaller in diameter. Fast easy action—requires only a light, quick, one-hand push. Locks automatically—without twisting or turning—to make an impact proof and leakproof seal. 360° swivel action eliminates kinking of line. Integral check valve permits connecting or disconnecting under pressure without backlash and whipping. The PUSHOMATIC is ideal for fluid and gas applications up to 7,500 PSI. Pipe sizes 1/8" through 3/4". Also straight through Quick Couplings 1/4" through 3". For full information contact our nearest office or write for Bulletin 1500.

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WESTERN INDUSTRY/SEPTEMBER 1960

AIRFOIL BLADED FANS

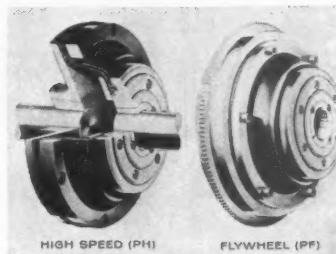
... feature low velocity radial rim wheel design

A new line of airfoil bladed centrifugal fans which feature an exclusive low velocity radial rim wheel design for general ventilation and industrial process applications is now available. Designated the Series 116 line, the new units are qualified to carry the AMCA Certified Rating Seal for the full range of sizes, Class I through Class III. The fans are recommended for use in supply and exhaust systems for ventilation and industrial processes; in air conditioning installations of conventional low velocity, high velocity or double-duct systems; in industrial air conditioning systems; in heavy duty industrial systems; and in ventilation of tunnels for vehicular, pedestrian and railroad traffic. Air entering the Series 116 fan inlet is accelerated gradually to a maximum at the throat section. The radial rim wheel design allows the air to expand over the entire blast width and pass over the airfoil shaped blades at relatively low velocity with minimum turbulence. With this wheel design, efficient pressure conversion through the wheel is accomplished and boundary separation is reduced. Air leaves the blade tips at relatively low velocity as compared with conventional conical and curved rim wheel designs. The reduction of turbulence resulting from airfoil blading combined with the radial rim wheel contributes to unusually quiet fan operation. Streamline inlets in the Series 116 fan are of aluminum or steel spun to close tolerance with smooth contours. *American-Standard Industrial Division.*

... FOR MORE DETAILS, CIRCLE NO. 317

TWO NEW FLEXIBLE CUSHION COUPLINGS

... for high speed, high torque and flywheel applications



A pan-shaped rubber flexing element of entirely new design is the feature of two new cushion type couplings developed for high speed or high torque applications. The High Speed coupling consists of the flexible member supported on one side by a clamp-ring flange just like those furnished with the tire-type coupling, and with its larger side bolted to a steel disc. Both the flange and disc are equipped with taper-lock bushings for quick and easy mounting on shafts. Designed for speeds up to 5230 rpm, this coupling may be used with electric motors or internal combustion engines to operate such equipment as hammer mills, compressors, pumps, high speed fans, marine drives, and blowers. They are equally efficient on low-speed applications where torque requirements are high. The Flywheel type coupling is like the High Speed except that its larger side bolts directly to the flywheel of an internal combustion engine instead of being supported by a taper-bushed steel disc. These couplings are offered in sizes to fit the bolt circles of most standard SAE flywheels up to 1 9/16 in. diameter. *Dodge Mfg. Corp.*

... FOR MORE DETAILS, CIRCLE NO. 318

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Sanitary and Industrial
Positive Displacement Pumps:
nickel alloy or stainless steel.

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... for more details, circle No. 49
WESTERN INDUSTRY/SEPTEMBER 1960

Slik-Top

TON-TEX BELTING

for conveyor jobs
requiring
belting with
a low-grip carrying
surface

- Slik-Top is a smooth, bareback synthetic fabric top surface conveyor belt that is virtually frictionless. It is ideal for "stall" operations in which the product being conveyed must remain stationary while the belt continues to move.



- If you are troubled with scoring or scratching of products carried, jam-ups due to excessive friction of belt carrying surface, products not being deflected properly from belt, printed surfaces or labels being smeared or torn, then Slik-Top is the answer to these and other similar conveying problems.

- Slik-Top is thin, flexible and strong with a carrying surface that has excellent "release" qualities. It will resist abrasion and moisture.

- Troublesome conveying problems can usually be licked with Slik-Top Belting. Write our Engineering Department today for more information.

TON-TEX CORPORATION, GRAND RAPIDS 2, MICH.
1180 AUZERAIS AVENUE, SAN JOSE 26, CALIFORNIA



TON-TEX CONVEYOR AND TRANSMISSION **BELTING**



... for more details, circle No. 50 on Reader Service Postcard

New Western ideas in steel

Architect: John Carl Warnecke, A.I.A.



Steel Makes Maintenance Easy. Structurals and walls of steel make light work of maintenance at De Anza High School in El Sobrante, Calif. USS Structurals were used in the steelwork fabrication by Golden Gate Iron Works, Inc., San Francisco. Steel wall panels are practically maintenance-free—an occasional wash will keep them looking new for years!

Architect: Gordon Stafford, A.I.A.



Sutter Strikes It Rich with Steel! Steel schools are fast to erect, easy to finish, incombustible—and handsome too! Fine example: Sutter Junior High School in Sacramento! Floating canopies of steel shelter and shade exterior corridors between buildings. These angular ribbons of light-weight decking were formed from USS Steel by R. C. Mahon Co., Los Angeles.



Small Fry Favorite Formed with Steel. At nursery schools throughout the West, undergraduates never wear out their welcome on this Safti-Play Slide by Southern California Pipe and Steel Co., Los Angeles. The slide is formed of youth-proof USS Stainless Steel. It won't tarnish, it's corrosion-resistant and smooth—and the end result is lots of fun!



Steel Plays a New Tune in School Furniture. A progressive note in modern school furniture is now available, styled in steel. Tables and chairs are formed from durable USS Cold Rolled Sheets by Virco Mfg. Corporation, Los Angeles. Strong steel furniture won't wobble, warp or wiggle—the tapered steel legs lock into place for long-term style and beauty.

This mark tells you a product is made of modern, dependable steel. Look for it on the products you buy.



The shortest route to a winning bid may well be based on steel! Western architects and builders are enjoying the cost-saving advantages of steel for school construction and equipment. Steel saves money and adds beauty in modern schools today. Before you bid, build or buy—contact your nearby United States Steel representative.

STEEL FOR EVERY PURPOSE FROM A SINGLE SOURCE



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WESTERN INDUSTRY NEWS

THE INDUSTRIAL WEST . . . ON ITS WAY

PLANTS • PRODUCTION • DISTRIBUTION • PERSONNEL

Cannery Adds Facilities For Container Making

BUHL, IDAHO — Construction of 55,000 sq. ft. of added warehouse facilities at the Green Giant Co. plant here is under way, estimated to cost some \$256,000. The building will house the can manufacturing operations which will supply the cannery with its own container needs.

Construction will continue through the 1960 pack operations and can-making machinery is expected to be installed by January, it was reported recently from Salt Lake City.

R. & J. Dick Moves To New Headquarters

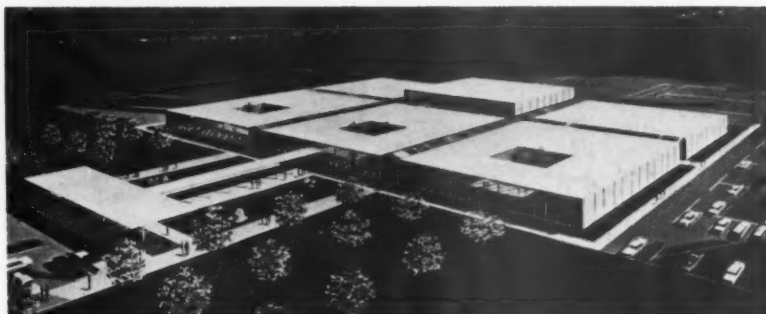


SAN FRANCISCO—After 32 years at 510 Bryant St., here, the R. & J. Dick Co., Inc., moved to these new headquarters at 520 Fourth St., with a formal opening Sept. 1. Branch Manager *Bland Ballard* said the move was necessitated by increased sales requiring increased space. The company handles power transmission equipment including belt-ing, roller chains, sprockets, conveyor drums, V-belts and sheaves.

Ballard said the old headquarters included 4,100 sq. ft. as compared to the new which has 10,000 sq. ft. for office, sales and warehousing.

R. & J. Dick has other West Coast branches at Seattle and Los Angeles.

Use High Frequency Power For Industrial Lighting



SEATTLE — Virtually all of the new 126,000 sq. ft. facility of United Control Corp. at Overlake Park, here, will be illuminated by brilliant new high frequency fluorescent lighting based on power concepts developed by engineers of Leach Corp. for U. S. air and space programs.

Contract for illumination with 840-

cycle instead of conventional 60-cycle current was disclosed by the Leach Corp., pioneer Los Angeles electronic firm. High frequency installation, believed largest in world at 107,000 sq. ft, will increase foot-candle brilliance, reduce heat, lower power requirements, cut down ballast approximately 10 times, according to Leach.

Convair-Astronautics Completes New Plant

SAN DIEGO — A new \$1,000,000 electronic manufacturing plant which will be used to produce parts for advanced weapons systems and space vehicles, will be completed at Convair-Astronautics early this month.

S. L. Ackerman, Convair-Astronautics director of electronics products, said the 68,400 sq. ft. building brings the company's investment in the Kearny Mesa plant to more than \$28,000,000.

Ackerman said the building which will be located east of the Convair-Astronautics factory buildings, will use a dust control system to protect sensitive electronic packages. Everything going into the building will go through this system.

Convair-Astronautics is a division of the General Dynamics Corporation.

Clute Acquires Truco And Ajax Iron Works

DENVER — The Truck Equipment Co. and the Ajax Iron Works, both Denver organizations, have been acquired by the Clute Corp., according to a recent announcement by *John H. Lowell*, president of Clute. Both firms were acquired through an exchange of stock.

Ajax Iron Works is a custom metal fabricating firm while Truco specializes in the production of labor and time saving equipment for the utilities and railroad industries.

The 50-year-old Ajax company, once well known throughout the Rocky Mountain region for the manufacture of mining equipment, is now engaged primarily in machining and manufacturing parts for the truck, trailer and farm equipment industries. The firm is currently doing about \$500,000 annually in sales.

GEAR FOR INDUSTRY
THE Lufkin LINE
 OIL FIELD PUMPING UNITS

Did You Know . . .

that, the town of Lufkin, Texas, besides being world famous for coon hunting, and cooking, southern style, is also the home of Lufkin Gears for Industry, Oilfield Pumping Units, and Heavy Duty Truck Trailers?



V. J. Fawcett

that, the town is nestled among the tall pine trees of East Texas, where forests thrive and grow 5 times faster than in other parts of the U.S.? Heavy rainfall and warm temperatures make it so.

that, the great southern paper industry utilizing southern pine, long leaf and loblolly pine, began in Lufkin, Texas—home of the Southland Paper Mills, back in 1937? E. L. Kurth, Board Chairman of Lufkin Foundry and Machine, is President of Southland, and to Mr. Kurth goes the credit for pioneering this vast industry from its infancy. Modestly, however, he would be the last to claim such recognition.

that, Lufkin Oilfield Pumping Units have earned worldwide recognition for performance, dependability, and long life?

that, Lufkin Gears for Industry are fast gaining prominence in the fields of refining, pipelining, marine propulsion, aircraft ground support, and yes, even outer space?

But it's not all sweatin' and straining at Lufkin—the folks there are easy goin' and find time to go cat fishing, coon hunting, squirrel and crap shooting, and sometimes, go in for just plain loafing.

VIC FAWCETT
PACIFIC COAST MANAGER
GEAR DIVISION

Lufkin FOUNDRY
 & MACHINE COMPANY

. . . for more details, circle No. 51

Air Reduction Pacific Expanding New Plant



Harold P. Etter, president of Air Reduction Pacific Co., announced last month that the company will spend \$1,000,000 in expanding the Richmond, Calif., air separation plant to boost the rated capacity to more than 65 tons per day of high purity liquid oxygen, nitrogen and argon.

RICHMOND, CALIF.—Air Reduction Pacific Co.'s air separation plant here which was opened in March, 1960, is being expanded to increase production by 20 per cent, according to *Harold P. Etter*, president. He added that a second unit is being constructed to serve the rapidly growing industrial needs of the San Francisco Bay Area. The new unit will produce 32 tons per day of liquid oxygen, nitrogen and argon.

Scheduled for completion early in 1961, the new construction will add

7,000 sq. ft. of floor space and the enlarged storage facilities will have a capacity of 10,000,000 cu. ft. of industrial gases.

Liquid oxygen, nitrogen and argon are used for many applications in the metalworking, food, steel, electronics, chemical, cryogenics, aircraft and missiles industries.

Air Reduction now operates 15 plants on the West Coast. Air Reduction Pacific Co., a division of Air Reduction Co., Inc., of New York, has headquarters at San Francisco.

Shipside Kiln Drying Speeds Lumber Handling

ALAMEDA, CALIF.—Kiln drying of lumber at shipside, an integrated operation reducing material handling to a minimum and saving importers and exporters transportation costs, will be inaugurated in California next month, when a new facility at Encinal Terminals, here, is completed by Harbor Kiln Co.

Lumber unloaded on the dock is moved by fork lift to an automatic stacker, and thence into the direct-fired kiln designed by Bloxham Engineering Co. of Berkeley, Calif. It has 120,000 board ft. of capacity. After drying, the lumber can either be kept under cover until ordered out, or else shipped directly.

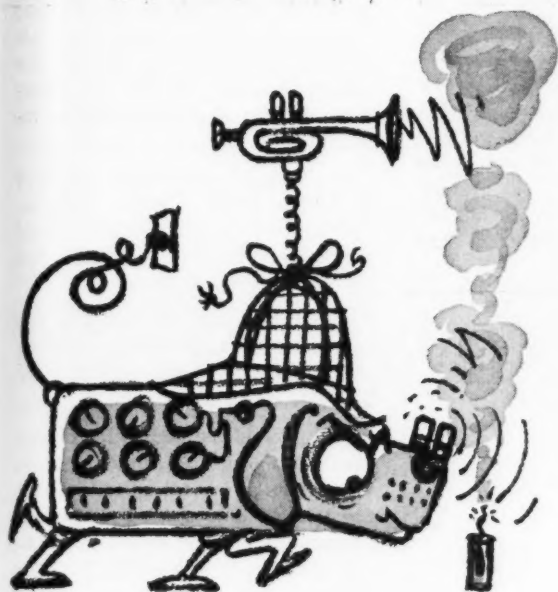
Vaughan Wall Opens San Francisco Office

SAN FRANCISCO — Vaughan Interior Walls, Inc., makers of a system of movable walls made of fireproof gypsum panels, has established an office here, according to *Wayne W. Vaughan*, president of the firm.

The new headquarters is under the direction of *Byron Johnson*, a corporate vice president, and is located at Canal and Starlite streets, South San Francisco.

Nationally established, Vaughan has franchise representatives in all sections of the country. The new division of the parent firm will serve Northern California as well as the Bay Area. The home office is in Los Angeles, where the system was researched.

modernize with an electronic "THINGAMAJIG"!



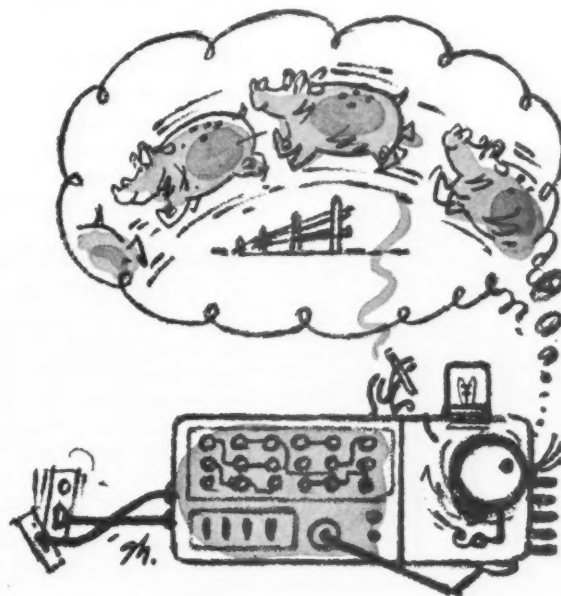
PHOTOELECTRIC SNIFFERS smell out smoke—then summon the fire brigade, turn off ventilation systems, turn on sprinklers, shut down equipment, even close doors.



ULTRASONIC SCRUBBERS clean tiny component parts fast. This beats slow and costly old-fashioned ways, solves problem for precision equipment makers.



AUTOMATIC FILLER-UPPERS fill all types of containers accurately and quickly—even measure and mix liquids. Perfect for beverages, chemicals, drugs, foods...



ELECTRONIC COUNTERS count anything — hippos to hula hoops...tackle practically any counting problem with ease. Lots of industries are adopting them.

There are thousands of electronic devices that make work easier, safer and more productive. Call us for information on "thingamajigs" that apply in your field.

P·G·and·E·
Pacific Gas and Electric Company

Columbia Wax Opening Fresno Branch Office

FRESNO, CALIF. — Addition of three sales representatives and establishment of a new branch office here has been announced by *H. N. Farthing*, general sales manager, Columbia Wax Co.

The new representatives are *William Johnston*, *Harold W. Neilly* and *Robert O'Sickey*. Columbia, which has its general offices and manufacturing facilities at 530 Riverdale Dr., Glendale, Calif., makes floor care products.

Columbia River Paper To Expand Facilities

SALEM, ORE. — The Columbia River Paper Co. has announced plans for a large expansion and development project at the downtown plant here.

Donald C. Ellsworth, Portland, vice president and secretary, said major developments would include construction of a new warehouse and finishing plant. The plan would also involve the eliminating of a railroad bottleneck, construction of a new access street and razing buildings.

California-Canada Pipe Line Bidding Underway

SAN FRANCISCO — The 1,400-mile Alberta-California natural gas pipeline system will call for construction bids immediately and break ground this fall, Pacific Gas & Electric Co. President *Norman R. Sutherland* said recently.

Sutherland's statement followed California Public Utilities Commission authorization to PG&E to build the 300-mile California section of the big international pipeline.

Commission action was the last governmental authorization needed and was the go-ahead signal for the \$340,000,000 construction job.

The line will be one of the biggest pipeline projects ever undertaken. It will cross the Canadian Rockies, the Cascade Mountains and 14 major rivers to bring new supplies of natural gas to more than 6,000,000 people in PG&E's northern and central California service area.

"We expect to start receiving Canadian gas in California in the winter of 1961-62," Sutherland said. "Deliveries will average about 415,000,000 cu. ft. a day."

North Coast Mfg. Buys Montag Furnace Design

PORTLAND — The 80-year old manufacturer of stoves, furnaces and lately cooling systems, Montag Inc., 8701 Denver Ave., here, has been sold to *Albert Tuch*, Los Angeles, for a sum in excess of \$500,000, it was disclosed recently. Tuch and *David Weisz*, also of Los Angeles, are retaining ownership of the Montag plant, however, they have sold the furnace name and designs, as well as heating and air conditioning stock and inventory to North Coast Mfg. Corp., 7200 S. E. 92nd, here.

North Coast spokesmen report that the Montag operation will move to the S. E. 92nd plant shortly. North Coast will continue making the Montag furnaces as well as their own products, Norco, Southern Air and Nor-Coil, according to *Arnold Foster*, vice president. *Melvin A. Peters* is president.

North Coast opened a new plant at Denver this spring to help serve the Rocky Mountain area.



PACIFIC



WET PIT
TYPE
SINGLE PUMP
UNIT WITH
SUMP COVER
DUPLEX,
DRY PIT &
HORIZONTAL
TYPES
AVAILABLE

Features PUMPS FOR INDUSTRY

NON-CLOG PUMPS

THOUSANDS OF PACIFIC NON-CLOG pump installations handle industrial wastes, heavy fluids, liquids containing solids, refuse and pulp. Available in special metals for handling products of canneries, breweries, food, and other processing plants. Send for Bulletins 1850 series.

CONDENSATE AND BOILER FEED UNITS

WIDE RANGE OF SIZES AND TYPES conform to latest ASVHE recommendations, for vertical, elevated or floor level installation. ReturnZall package units (illustrated) are complete package units, with square cast-iron receiver, bronze fitted centrifugal pumps (Type GR), standard heavy-duty NEMA motor and float controls. For complete information send for Series 1700 bulletins.

OTHER PACIFIC INDUSTRIAL PUMPS

- Sump pumps
- Circulators
- Fire pumps
- Proportioning pumps
- Horizontally split case centrifugal pumps
- Contractors' self priming pumps

- Diaphragm pumps
- Centrifugal pumps
- PACO Turbine-type pumps
- Rotary pumps



DUPLEX
PACKAGE UNIT
AVAILABLE WITH 30,
45, OR 60 GALLON CAST
IRON RECEIVERS



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Manufacturers & Distributors of Pumps for Every Service
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... for more details, circle No. 53 on Reader Service Postcard

Western Machinery New Yale Truck Distributor

SALT LAKE CITY—Western Machinery Co., 2300 South Main St., here, has been appointed franchise representative for the sale and service of Yale industrial lift trucks and tractor shovels for the Utah, Western Wyoming, Southern Idaho and Northeast Nevada territory.

A distributor of industrial, mining and construction equipment founded in Salt Lake City in 1915, Western Machinery maintains sub-branch sales operations in Idaho at 3320 Western Ave., Boise, and 590 West 19th St., Idaho Falls.

The Salt Lake City Headquarters comprises 19,000 sq. ft. of floor space, including offices, display area, parts inventory warehouse and service shop. A railroad siding and loading dock expedite handling of large shipment of equipment and parts. Adjacent to the main building is a covered area which adds 2,500 sq. ft. of storage space.

N. N. Economou, operations manager for Western Machinery, is in charge of lift truck and tractor shovel sales for the firm. A. L. Ringwood is service and parts manager.

Permanente Bares Details Of Alaskan Cement Plant

ANCHORAGE—Details of plans for the new \$5,000,000 Permanente cement plant were released here last month by Gordon K. Wilson, sales manager for Permanente's Northwest division.

The new plant, tentatively planned for a site about 65 miles north of here at Sutton, will employ about 100 persons. Permanente plans to use 240 acres of limestone deposits at Sutton for the manufacture of the cement. Preliminary work will be done next year, with the major part of the plant's construction scheduled for 1962.

The factory will have an initial production capacity of 500,000 barrels or 2,000,000 sacks of cement annually. Existing distribution facilities at Fairbanks and here will continue to function, with other Permanente distribution depots added as needed.

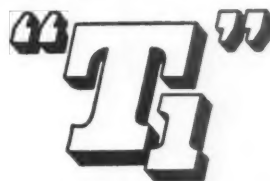
The price of cement distributed from the company's local and Fairbanks facilities has been reduced by \$1.00 per barrel, or \$6.95 per barrel in bulk and \$7.45 per barrel sacked, Wilson said.

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Expansion Underway At Goodrich Rocket Plant



RIALTO, CALIF. — Ground was turned recently at the B. F. Goodrich rocket motor plant, here, which will ultimately result in three times the present manufacturing capacity. A new office building will be erected where these three executives are using a spade at the corner of Locust St. and B. F. Goodrich Blvd. Left to right are W. D. Jones, rocket motor product manager; F. R. Carvell, general manager of BFG rocket motors; and A. B. Japs, technical manager.

The new one-story structure, comprising 7,200 sq. ft., will provide office facilities for administration, sales and engineering of B. F. Goodrich Aviation Products, a division of B. F. Goodrich Co.

Kennecott Copper Lets Pilot Plant Contracts

SALT LAKE CITY — Kennecott Copper Corp. has let contracts for investment of about \$750,000 in pilot plant equipment at the firm's Garfield smelter to experiment in use of oxygen in the smelting of copper, it was confirmed recently by C. D. Michaelson, general manager of Western mining divisions here.

Here, the use of oxygen in speeding process time in reverberatory furnaces will be tested, he said.

The actual decision to build the pilot plant follows experimentation in pyro-metallurgical department of the Kennecott Research Center here and some in-plant experimentation at Chino, N. M. division of the firm, it was reported.

Western Kraft Expands Production, Holdings

PORTLAND—*Ira C. Keller*, president of Western Kraft Corp., a Portland based pulp and paper company, has announced signing of a 10-year lease with an option to buy two paper mills and three corrugated container plants in California.

Involved in the deal was purchase of the businesses of the California plants as well as the leasing of the \$6,000,000 plants and machinery. Properties taken over by Western are: Kalof Pulp & Paper Co., and the corrugated box plant of Cadillac Container Co. of Port Hueneme, Calif.; the Quaker Container Corp.'s corrugated mill and box plant at Richmond, Calif.; and Quaker's corrugated container plant at Vernon, Calif.

Keller also announced plans to expand Western Kraft's plant at Albany to produce 135,000 tons of linerboard per year. The plant now produces 90,000 tons. The multi-million dollar expansion will include a second paper making machine.

A converting division of Western Kraft at Beaverton, Ore., Western Corrugated, is nearing completion of a \$25,000 plant expansion program designed to increase capacity, quality and service to its container customers. The Beaverton division makes corrugated shipping containers used by some 350 Northwest agricultural and industrial concerns.

Plan Aircraft Factory For Roseburg Airport

ROSEBURG, ORE.—Thalman Industries of Salt Lake City is planning to construct an aircraft factory here at Roseburg Airport, according to confirmation reports from Roseburg Mayor *Arlo Jacklin*.

Thalman, who designed the T-4, has built three prototypes of the model and is currently arranging for type certification of the design by the Federal Aviation Agency.

The plane is a mid-wing monoplane seating four persons and featuring a plexiglass nose and wide windows. Built of plywood and plastic with aluminum honeycomb strengthening, portions of the airframe are also made of plywood, which is one reason for locating the factory in Roseburg.

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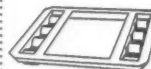
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New Pacific Southwest Headquarters For Square D



The Square D Co. has recently occupied these new headquarters at 4301 Valley Blvd., Los Angeles. The assembly plant will service the Southern California, Arizona, Southern Nevada and Hawaii areas.

LOS ANGELES—The Square D Co. has moved its new Pacific Southwest region headquarters next door to its former plant, according to *D. H. Miller*, vice president and divisional manager.

The existing Los Angeles facilities were reorganized and expanded, according to Miller, to provide faster, more efficient service in the fastest growing industrial area in the nation.

The new facility thus becomes the Los Angeles counterpart of Western Division assembly plants previously established in San Francisco, Seattle and Denver.

Facilities include a spacious assembly plant, warehouse and service shop. Departments include Los Angeles district sales, ordering and estimating, application and job engineering.

In charge of all regional operations is *R. L. Russell*, Pacific Southwest regional manager, assisted by *John Miller*, plant superintendent, and *M. E. Rich*, office manager. Marketing functions throughout the region are under the direct supervision of *L. E. Krauss*, Los Angeles district sales manager; *E. C. Butts*, San Diego district sales manager; *W. R. Harm*, Phoenix district sales manager; and *A. E. Linzer*, Honolulu district sales manager.

The facility which had previously served the Pacific Southwest Region next door to the new regional offices and plant, will now function exclusively as Western Division administrative headquarters and manufacturing plant for many of the company's standard products.

New Extrusion Firm Formed at Petaluma

PETALUMA, CALIF.—A recently formed firm, Luma Industries Co., has gone into production of extruded plastic products at 330 Pleasant St., here, north of San Francisco in the Bay Area.

Under the leadership of *Philip J. Blanchett* and *Orwin G. Maxson*, both formerly with Dow Chemical Co., the firm will produce extruded shapes in virtually all of the plastics materials for application in the lighting, boat manufacturing, luggage, window manufacturing, building, furniture making and other applications. The first of a battery of Davis-Standard extrusion machines has been installed.

Medford Corp. and U. S. Plywood Sign Agreement

MEDFORD, ORE.—The U. S. Plywood Corp. has announced an agreement with Medford Corp. that will put Medco in the plywood business and will give the plywood firm a strong supplier.

According to an announcement from the presidents of the two organizations, Medco will build a 7,000,000 sq. ft. a month capacity plywood plant here with U. S. Plywood engineering and operating know-how to back them up.

The two companies have signed a long term agreement which turns the Medco production over to U. S. Plywood for marketing.

Triplex Div. to Diversify Manufacturing Operations

PUEBLO, COLO. — Triplex Division of Aluminum Industries, Inc., will be expanded to manufacture products other than aluminum automotive pistons, according to *A. O. Herud* of Cincinnati, Ohio, president of Aluminum Industries.

Production will be of heavy aluminum industrial castings, compressor parts and other products not directly associated with the automotive industry, he said recently.

John E. McBrady, director of industrial relations for AI in Cincinnati, said manufacturing of some products and some equipment will be transferred here from the firm's Cincinnati operation.

Triplex is among the world's largest producers of aluminum automotive pistons and the only producer in the Rocky Mountain region. The company's main market is automotive equipment manufacturers in the Detroit area. It has a world-wide market in replacement pistons.

Since moving to Pueblo from Chicago in 1949, the division has approximately tripled in size. It now has 625 employees. There were unconfirmed reports that the expansion would add from 100 to 500 men at the plant here.

First Pre-Built Homes Arrive in Anchorage

ANCHORAGE—Twenty half-houses were unloaded here recently from a barge, finishing the next to last lap of a journey that started in Carlisle, Ind. The last lap will see them transported to foundations and put together to form 10 ready-built homes.

They represent the first shipment to arrive in Alaska for Modern Homes, Inc., formed here last winter. The local firm was purchased last month by Centex Construction Co. of Dallas, Texas.

The houses, completely finished but constructed in two sections for shipping, came to Portland by rail, one-half of a house per car. There the halves were loaded on a 350 ft. barge for the sea journey here.

The manufacturer is opening a new branch plant at Spokane, Wash., in addition to its home factory in Indiana. The houses come complete with closets, stoves, refrigerators, beds and bedding, if desired.

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Spec-Tronics Completes New Van Nuys Quarters

VAN NUYS, CALIF.—Completion of the new headquarters facility for Spec-Tronics, at 13901 Satcoy St., here, has been announced by **Ronald M. Speck**, President.

The \$250,000 structure will serve the full office, production and engineering needs of the company. Additionally, the facility will house Spec-Plating, Inc., to perform precious metal plating on printed circuitry with barrel plating for hardware.

San Diego Council Denies Zone Change

SAN DIEGO—The local City Council denied a zone change requested by Electronics Capital Corp. to permit construction of a \$1,000,000 office building at 6th Ave. and Palm, here.

The investment firm's net assets are second only to those of General Dynamics, here, and it could bring much industry to San Diego, according to **John Rhoades**, attorney for the firm.

Charles Salik, president of Electronics Capital Corp. and Rhoades both, indicated that no other San Diego site would be considered.

Miniature Trailer Doubles As Container



Ed J. Sullivan shuts door on Min-I-Van that can be removed from semi-trailer chassis with fork truck. Note slots in base of van for forks. Van has small enough dimensions to be maneuvered through plant aisles.

LOS ANGELES—A miniaturized semi-trailer, 8-ft. long and 5-ft. wide, is performing dual service by hauling loads behind a three-wheel tractor on

the highway and being used as a highly portable in-plant container.

Distributed by **Ed J. Sullivan**, Equipment Engineering Service, the van itself is lifted easily from the semi-trailer chassis by fork truck for movement into the plant. Once inside it can be used for a utility container or for removal of packaged items, scrap or other material.

Returned to the trailer chassis, the container is secured and is ready for highway travel of any distance or for a short plant-to-plant haul. Six Min-I-Vans can be loaded onto a conventional 30-ft. flatbed trailer if larger shipments are required.

The van itself is designed for pulling via fifth-wheel by a three-wheel tractor powered by a 12.9 hp gas engine. Seating two men, the tractor is capable of hauling loads at street or highway speeds. Called the Westcoaster, the vehicle is made by Ingersoll Kalamazoo Div., Borg Warner Corp.

Straza Industries Acquires Solidyne

EL CAJON, CALIF.—Straza Industries, San Diego-based manufacturing firm, has announced the formation of a new electronics division and the acquisition of Solidyne, a San Diego electronics company.

The electronics division will occupy a new 22,000 sq. ft. building at the company's main plant here.

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Communications System Despite Factory Noise

HAWTHORNE, CALIF. — A new communications system with exceptional noise cancellation capabilities was demonstrated here recently and allows reliable voice transmission from factory production areas where normal voice communication is impossible.

Called Norcom, it was developed by Northrop Corp. to allow clear, reliable voice transmission in extreme high noise environments such as those associated with a number of fabricating industries.

It is also suited for extensive and spread out areas common to Western plantsites. Each Norcom station is equipped with its own amplifier and up to 50 or more workers can be plugged into a common send and re-



Individually controlled Norcom unit is operated under extremely noisy conditions by worker. Control station at right houses adjusting knobs for varying noise levels.

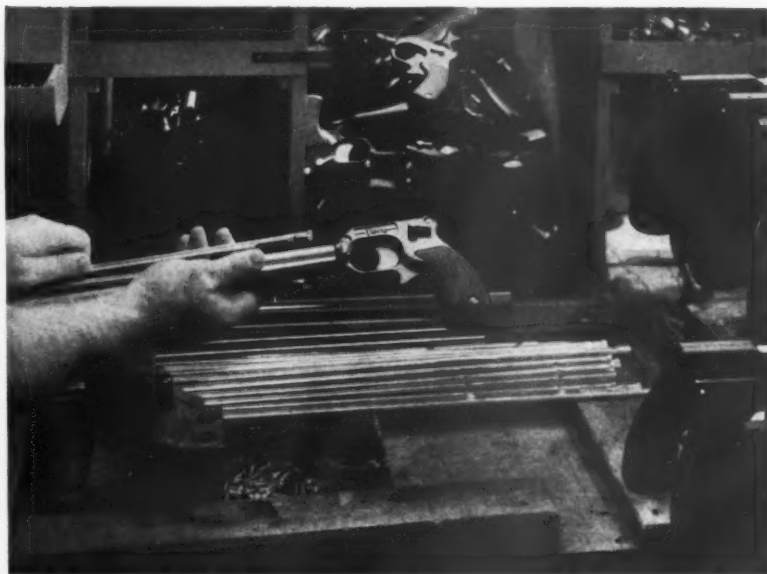
ceive line with little signal variation.

Units are individually controlled so that malfunction or breakage with one station does not impair operation of the overall communication system.

Highly reliable and tough, the equipment uses transistorized parts and replaces a conventional four wire system with two wires.

Installations are designed to tie in with existing communications networks and are engineered to meet industrial requirements for conference line intercoms, paging and telephone tie-ins.

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Mill-A-Matic Inc. Opens Integrated Job Shop



Giving a part a closeup look after finishing cycle on Milwaukee-Matic are from left, J. Joerger, sales manager, Kearney & Trecker Corp., W. Brainard, chief engineer, K & T, both Milwaukee, Wisc., and foreground, Vaughn Clark, president, Mill-A-Matic Inc.

SANTA ANA, CALIF.—A complete metalworking and manufacturing job shop operation has been opened by Mill-A-Matic Machining Inc. in a new plant located at 3210 Central Ave., Santa Ana, Calif.

Main production unit here is a Kearney & Trecker Milwaukee-Matic tape controlled machine that coordinates milling, drilling, boring and other manufacturing steps in one device.

The firm is equipped to offer com-

plete manufacturing service from engineering to finished parts or products including assembly, painting, packaging and warehousing. The firm is headed by Vaughn Clark, president and Gene Walloch is sales manager.

Turnkey Now Subsidiary Of Electric Furnace Co.

SOUTH GATE, CALIF.—Turnkey Engineering Co., Inc., here, has become a wholly owned subsidiary of the Electric Furnace Co. of Salem, Ohio, according to an announcement by Kenneth U. Wirtz, president of Electric Furnace Co., and Jess J. Andresen, president of the California concern.

The engineering firm, founded in 1951, has a main office and complete fabricating facilities on a 2½ acre industrial tract here. The company designs, builds and installs metal cleaning equipment, spray booths, ovens, plating equipment, heat treating furnaces, air purification systems, materials handling and conveying systems.

Turnkey will handle the Electric Furnace Co.'s industrial heat treating furnaces and protective atmosphere generating equipment.

Tool Research To Buy John J. Foster Firm



COSTA MESA, CALIF.—John J. Foster Co., major developer of honeycomb and specialized metal products for the air, missile and space industry, is being purchased by Tool Research and Engineering Corp.

According to the president of Tool Research, Leopold S. Wyler, the purchase will pour an additional \$3,000,000 into Tool Research sales volume.

Noah Dietrich, Tool Research chairman, announced the company would be operated as a division of Tool Research and will continue to be headed by John J. Foster.

The Costa Mesa facility occupies 7.5 acres of leased area and has more than 70,000 sq. ft.

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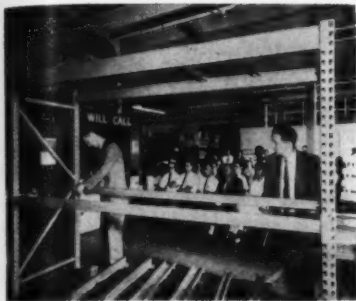
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WESTERN INDUSTRY/SEPTEMBER 1960

Acme Steel Demonstrates New High Strength Rack



Locking cross beams into place, George Husted, left, and Bob Warns, Acme Steel Co., demonstrated new high strength racking to members of Garrett Supply sales staff. Units can hold up to 30,000 lbs. of material.

LOS ANGELES—Recently demonstrated at Garrett Supply Co. was a new high strength storage rack system that can be erected without use of tools and features a load-locking device that anchors cross members to upright columns.

George Husted and Robert Warns represented the manufacturer, Acme Steel Co., and served as a demonstration team to rapidly assemble the AIM brand racking before members of the Garrett sales staff who will distribute the product in Southern California.

Basic rack parts consist of 3-in. by 3-in. columns welded to channel sections that form front-to-back and diagonal bracing. Cross beams, designed with two reinforcing channels, are adjustable on 2-in. centers.

The load locking device is a steel bolt that is an integral part of the cross beam and locks the beam into place on the column. The bolt is operated without tools and cannot be jarred loose or accidentally disengaged.

Racks can be modified through accessories to store loaded pallets, skids, dies, or drums. Basic models have a 23,000 lb. capacity and a heavy duty line will support up to 30,000 lbs.

Moulton Electronics In New Building

LYNWOOD, CALIF.—Moulton Electronics, Inc., local distributor specializing in connectors, is now settled in its new building at 2909 East Imperial Highway, several doors from its former location.

The new structure accommodates executive and sales offices, stock rooms and warehousing facilities on a 100 foot frontage.

Darling Co. to Open Tucson Branch Plant

TUCSON, ARIZ. — The R. E. Darling Co., Inc., Washington, D. C., which manufactures more than 500 products for government and industry, will establish a branch plant here, according to Heinz Wegner.

Principal business of the company is the manufacture of oxygen hose for use in planes.

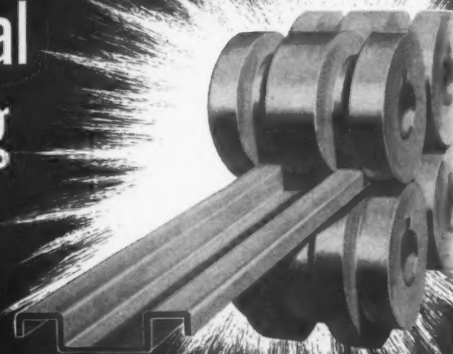
The 34,000 sq. ft. factory space was purchased in the former Central Industrial Park.

Universal Adds Eighth Roll Forming Machine

LYNWOOD, CALIF. — The eighth roll forming unit has been installed at Universal Molding Co. to aid in production that is currently on a 3-shift basis, according to Cliff W. Pratt, president.

Universal, a specialist in roll forming of aluminum and other metal shapes into angles, channels, tubing and custom designs, is expanding distribution in the southwest and now includes Hawaii in its territory.

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Roll-forming is the most economical way to produce quality angles, channels, tubing, and many intricate configurations. Precision tolerances, which are not practical with other methods of production, are routine with Universal's roll-forming experience. In many cases, holes, slots, etc., can be punched in the shape during forming, thereby eliminating second operation costs.

Universal's completely staffed Engineering and Tooling Departments are well qualified and ready to assist you in the design and development of any new shape, regardless of its complexity. A Universal Sales Engineer will be glad to discuss your project.

ALSO, by consulting Universal, it may be possible to completely eliminate tooling costs. Universal has the largest warehouse stock of aluminum roll-formed shapes available anywhere. If you find what you need from this huge selection, the cost of tooling stays in your pocket. Shapes of steel, brass, copper, etc., can also be produced from Universal's massive inventory of stock tooling.

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... for more details, circle No. 85 on Reader Service Postcard

Name Los Angeles Rep For Hydromatic Valves

LOS ANGELES — The William Wahl Corp., 11973 San Vicente Blvd., here, has been named West Coast stocking distributor for the Hydromatics line of industrial Flo-Ball valves. Hydromatics, Inc. has headquarters in Livingston, N. J.

William Wahl, president of the sales-distribution firm, said the local inventory will include a broad selection of Hydromatics exclusive leak-tight valves.

Optical Gaging Products Opens Western Facility

DOWNEY, CALIF. — Optical Gaging Products, Inc., a subsidiary of the Ex-Cell-O Corp., has opened a West Coast branch to manufacture chart-gages and to offer engineering services in the field of optical gaging. The new quarters will be located in the Ex-Cell-O Corp. plant at 12200 S. Bellflower Blvd., here.

The Western facility will prepare master chart-gages, layouts and precision duplicates.

MCI Breaks Ground, Plans New \$120,000 Facility

MONTEBELLO, CALIF. — Ground breaking ceremonies have been held for a 12,000 sq. ft. plant and office building, according to F. J. Robbins, president, Metallurgical Consultants Inc.

More than \$120,000 will be invested in construction costs, land and building features with occupancy scheduled for late November, Robbins said.

Building site will be about 1½ acres with 450 ft. frontage on Slauson Ave. in Montebello. Of tilt up construction, the building will include fireproof storage facilities for hydrogen, ammonia, nitrogen and other gases used in protective atmospheres for brazing and metal preparation.

A 4000 sq. ft. furnace room will feature overhead crane installations. Office and laboratory space will total 1400 sq. ft. The firm, specializing in furnace brazing and metal processing, is currently located at 4935 E. Slauson, Maywood, Calif.

Stereo Microscope Aids O-Ring Quality Control



Precision O-ring fabricated from newly developed elastomeric compound is trimmed and inspected prior to packaging by technician using 10-power stereo microscope. Rings are packaged in polyethylene envelopes designed for opening in dust-free areas without release of lint or dust particles.

LOS ANGELES — Fargo Rubber Corp. has developed an elastomeric compound that is being used for manufacture of seals, O-rings, and packings for precision applications and systems holding fluorocarbon fluids, lubricants, and helium gas.

The compound has withstood exposure to fluoroester alcohol, fluorocarbon oils and copper without causing discoloration or corrosion to metal

surfaces.

In order to meet accuracy requirements, O-rings made from this material are being molded in chrome-plated tooling that discourages residue.

Timing and inspection of molded products is performed under 10 power stereo-microscopes in dust-free environment. The firm is planning on expanded manufacturing and inspection facilities at 137 E. 58th St., L.A.

New Electronics Plant Underway at Tucson

TUCSON, ARIZ. — Ground was broken recently for a new building to house Milberger's Electric Co., which will bring a new electronics industry here, according to Max Milberger, head of the firm. He said the investment will be some \$250,000.

The 90x407-ft. structure will house offices and laboratories of the firm, and also provide some 33,000 sq. ft. for rent of other industry or warehousing, Milberger said.

The owner declined to name his product but stated "it would have a nation-wide market and we expect to have it on the market in six months."

Milberger now has a staff of six key men at work and he hopes ultimately to employ 150 to 200 men.

Presstite Div. Receives Award for Plant Safety

EL SEGUNDO, CALIF. — American Marietta Co., West Coast safety director, Ted Raie, recently presented a plaque to Ashton Rood, manager, and Adrian Arthur, plant safety supervisor of Presstite Division, here.

The parent company award honors the remarkable achievement of one full year, completely free of any type of accident.

Magnetic Metals Opens Toroidal Core Plant



NEWPORT BEACH, CALIF.—A combination plant and warehouse facility has been opened by Magnetic Metals Co. in a 5,000 sq. ft. structure. Here tape-wound cores will be fabricated and transformer laminations, powdered cores and other magnetic products will be warehoused.

Primarily a supplier to the growing electronics industry in Orange County, Magnetic Metals Newport plant is specially designed and equipped to make tape wound Centricores. Included are complete facilities for winding, annealing, casing, testing, warehousing and shipping.

Extensive annealing installations include a precision electric furnace and the quality control department houses

the first equipment for testing magnetic core laminations on the West Coast.

The plant is located in an industrial park on the outskirts of Newport Beach, some 40 miles south of Los Angeles.

Predict Atomic Power Will Compete With Oil

SAN DIEGO—A General Atomic engineer, *Tom B. Pearson*, predicted here recently that atomic power will be competitive with oil fuel for merchant ships by 1970. He said that technology will reduce the cost of atomic power plants within the next decade to the point where they will be competitive with oil in most ships.

Pearson stated that atomic fuel costs in the marine gas cooled reactor being developed by General Atomic will be half of the cost of oil and installation costs of atomic marine plants will drop sharply as demand increases and the parts can be standardized. He added that the atomic power plant in a freighter or tanker will require a 10-man crew instead of the average 16-man crew required for oil-powered steamers.

Zero Manufacturing Buys Control of Pli-O-Seal

BURBANK, CALIF.—Zero Mfg. Co., here, has purchased for cash majority stock control in Pli-O-Seal Mfg., Inc., Pasadena, it was jointly announced by *John B. Gilbert* and *C. Wallace*, respective presidents of the two firms.

Wallace will continue as president of Pli-O-Seal, makers of precision electronic component parts molded to very close tolerances. Zero specializes in aluminum components.

Nalpak Corp. Opens New Sales-Service Unit



HUNTINGTON PARK, CALIF.—Nalpak Corp., a distributor of material handling equipment, hand trucks, casters, and pneumatic or semi-pneumatic industrial wheels has moved to a new 30,000 sq. ft. location at 2901 E. Slauson Blvd.

The firm is headed by *Al Freedman* and *Morton Kaziff* is general manager. In addition to sales activity, the firm is equipped to perform servicing of all products.

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93-5

Industrial Smog Rule 62 Validity Upheld By Los Angeles County

LOS ANGELES—Los Angeles County air pollution rule 62 that bans burning of high-sulfur content fuel oil by industrial firms during the May to October "smog season" has been upheld by County Counsel *Harold W. Kennedy*.

The decision came after a number of oil suppliers in the Southland requested that the ruling be relaxed. Currently the ban prevents industry from using fuel oil of more than .5% sulphur content during the periods of intense atmospheric pollution induced by temperature inversion.

In addition to this move, industry has been participating in "operation fuel-switch," a voluntary conversion to natural gas fuel when the Air pollution Control District forecasts smoggy weather.

Long a subject of intense debate by firms in the greater Los Angeles industrial complex, the ruling has been subjected to a number of proposed amendments. One of the most recent suggestions stated that the ruling should be made effective only when

sulphur dioxide pollution of the air reached .3 parts per million for one hour and on days when smog was predicted.

Questioned here is whether atmospheric conditions could be forecasted with sufficient accuracy to allow intermittent use of the ruling.

Form Electro-Mechanical Instrumentation Firm

LOS ANGELES—Headed by *Douglas Keeney*, Brig. Gen. USAF Ret., Space Age Industries, Inc., has been established here at 1773 Sichel St. The organization will specialize in the research and production of electro-mechanical transducers and associated instruments for use in the aviation, missile, and automation industries.

Systems development in the fields of instrumentation, testing, and evaluation, including the automation of industrial processes will also be among the firm's activities. Space Age Industries, Inc., which is affiliated with Valvaire, Aircraft Division of Abbotwares, shares a 26,000 sq. ft. factory.

Industrial Opportunities Conference at San Diego

SAN DIEGO—Diversification of industries and prospects for the future will be the theme of the fourth Annual Industrial Opportunities Exhibit and Conference to be held October 5 and 6, here.

The exhibit, which is sponsored by the San Diego Chamber of Commerce and the San Diego County Industries Association, will include a section showing new products available for marketing and distribution and prototypes being offered for production and distribution for the first time.

The public conference will be held from 9:30 a.m. to noon in El Cortez Hotel and the exhibit will be shown in El Cortez Motel Garage from 1:15 p.m. to 9 p.m.

In cooperation with several local groups, the week of October 2 to 8 will be proclaimed San Diego Industries Week by Mayor *Charles Dail*. *Jack Buchart*, conference chairman, said the conference will include panels and speakers with at least one nationally known speaker.

Invitations will be extended to leaders throughout the nation.

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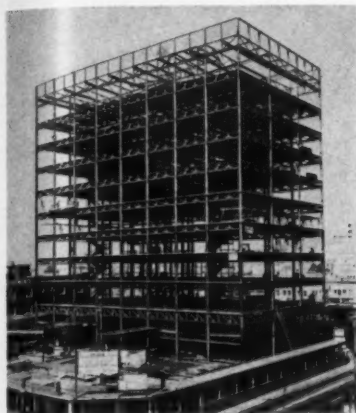
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Edison Co.'s Structure Underway at Long Beach



More than 1400 tons of steel structurals have gone into the completed framework erected by Montebello Fabricating Div., Kaiser Steel, for the Edison Co. at Long Beach, Calif. The \$4,800,000 project involves a ten-story structure with over 60,000 sq. ft. of space.

CF&I Granted Permit To Prospect Apache Land

PHOENIX—The Colorado Fuel and Iron Corp. has announced the successful conclusion of permit and option negotiations with the White Mountain Apache Tribe granting the CF&I an exclusive prospecting permit and option to lease Apache Indian land in Arizona. The negotiations have been underway for more than two years.

The permit covers 188 sq. miles in the northwestern section of the Fort Apache Indian Reservation and gives CF&I the right to prospect for all minerals except oil and gas. The permit is for two years, with the right to extend it for an additional two years if desired.

The presence of iron ore deposits has been known for many years. CF&I plans to continue the prospecting work previously done by the U. S. Bureau of Mines and the U. S. Geological Survey, which have indicated reserves of about 10,000,000 tons, according to R. R. Williams, Jr., manager of mines for CF&I.

If additional studies show that the deposit is materially larger, this would justify the expense involved in opening and operating a mine and providing transportation facilities in this virgin territory, Williams said.

CF&I also plans to investigate reports of deposits of asbestos, manganese and coal in the area.

United Pacific Aluminum Building at Longview

LONGVIEW, WASH.—Stockholders of United Pacific Aluminum Corp. have endorsed plans to build an aluminum reduction plant west of here, giving the company authority to lease Port of Longview facilities.

The Port will supply a building, waterfront and other access and will take title to about 15 acres of a 300-acre tract held in option by United Pacific. United will equip the facilities. Construction is expected to begin shortly on the first plotline.

RCA Constructing Office Building in Anchorage

ANCHORAGE—Construction of a new office building for Radio Corp. of America is scheduled for completion November 1 under terms of a contract by the Lathrop Corp. and the Lease Co. Inc., of Seattle and Anchorage.

The two-story, 27,000 sq. ft. building will cost \$432,000. Plans call for concrete block construction around an inner court, a parking area, and mechanical installations including a boiler and fan room.

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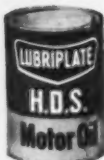
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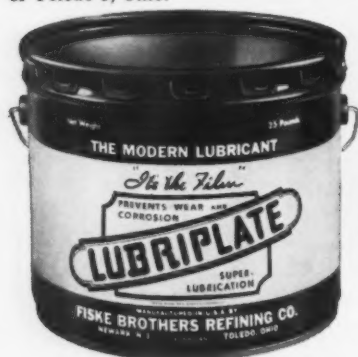
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Beach Installs Precision Contouring Equipment



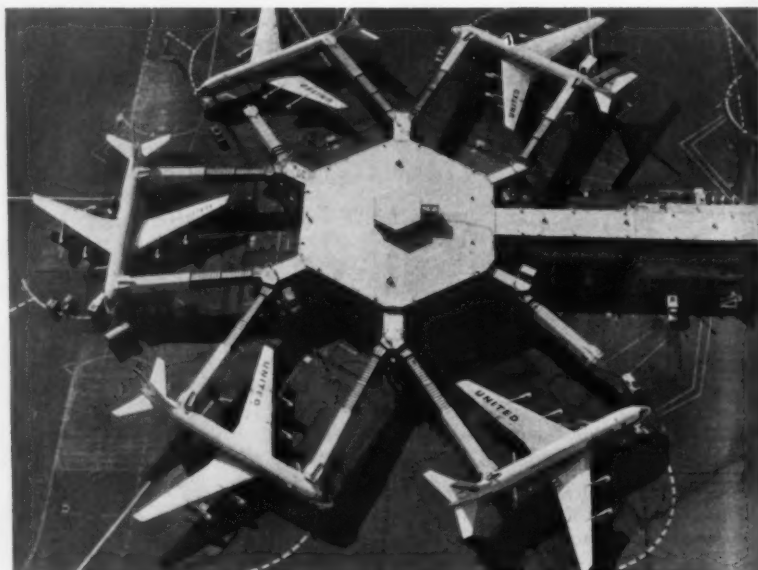
GLENDALE, CALIF.—John L. Czinger, Jr., general manager of Beach Mfg. Co., here, inspects a part contoured on the company's recently installed Ciclomatic. Normally it took 28 minutes to do this job on a conventional lathe with tracer attachment. The Ciclomatic did the job in four minutes with an accuracy of .0006.

A second contouring job was performed on this specialized production

copying lathe in 37 seconds as compared to four minutes on a standard lathe with tracer attachment.

S & S Machinery, Los Angeles, distributor of the Ciclomatic, has announced through its General Manager Jack T. Zeitman, that his firm will soon unveil a larger production copying lathe with the specific application of large pipe joint contouring. S & S is located at 6945 Bandini Blvd.

United Airlines Automate Jet Loading



Five DC-8 jetliners form a symmetrical pattern around concourse projecting from United Air Lines' passenger terminal at the San Francisco International Airport. The DC-8s are connected to the concourse by telescopic corridors called Jetways. The Jetways automatically extend and retract as needed to board and deplane passengers.

Ducommun To Market New Specialty Steel

LOS ANGELES — Appointment of Ducommun Metals & Supply Co., 4890 S. Alameda St., here, to market a new family of high strength, heat-treated steels in a four-state area has been announced by Great Lakes Steel, Detroit headquartered division of National Steel Corp.

Ducommun will direct distribution of the new specialty steels in Washington, Oregon, Arizona and California, said *Russell Rising*, vice-president of the Western metal and supply company.

The new specialty steels are finding use in bridges, highway construction equipment, truck frames and bodies, earth moving equipment, missile launchers, coal and iron-ore mining equipment, coal-fired electrical power plant equipment and many other applications.

Pesco Div. Borg-Warner Names E. V. Roberts Rep

LOS ANGELES—E. V. Roberts and Associates has been appointed sales representative for Pesco Products Div., Borg-Warner Corp., according to a recent announcement by *E. V. Roberts*, president.

Roberts will handle Pesco electronics products in California, Arizona, New Mexico and Nevada. These specialized products include static inverters, rotary inverters, frequency changers, axial flow fans, environmental control equipment and sub-fractional h.p. miniturized electric motors.

A Western and Southwestern representative for many of the nation's electronics firms, Roberts maintains offices in San Diego and San Carlos, Calif., Phoenix, Ariz., and Albuquerque, N. M., in addition to its Los Angeles headquarters.

Paper Mill Construction Underway at North Bend

NORTH BEND, ORE.—Building of Menasha's 125-ton paper mill in the sand dunes north of here is underway, according to *E. C. Manders*, general manager of the mill. Manufacturing of paper is scheduled for June 1961.

Don L. Spencer has been named administrative superintendent of the Menasha Pulp & Paper division of Menasha Wooden Ware Corp.

Effco Electronics Named Ampex Representative

ANCHORAGE — *Dale Matheny*, Northwest district manager of Ampex Professional Products Co. of Redwood City, Calif., recently presented a certificate of franchise for Ampex's magnetic recording equipment to *Don West*, commercial sales manager of Effco Electronics, 328 Fourth Ave., here.

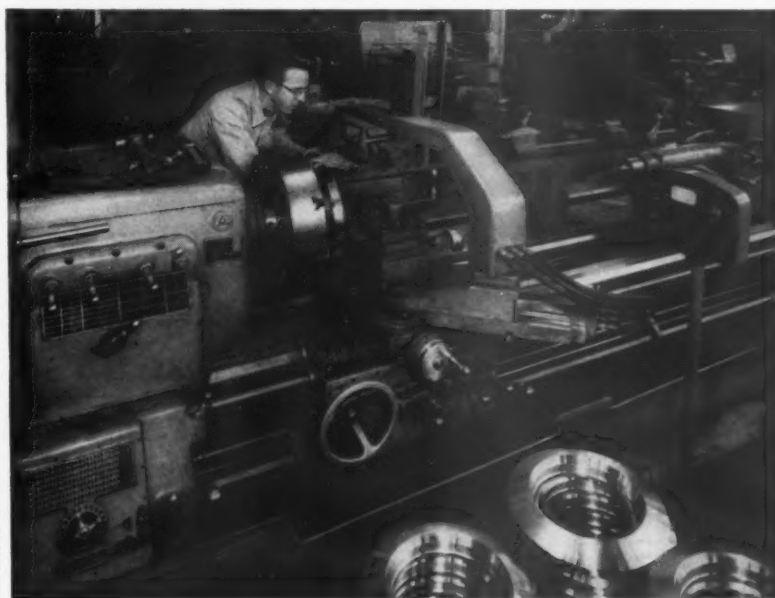
Ampex supplies equipment used in closed circuit TV, educational radio and TV. Effco will handle and service Ampex equipment locally.

Veeco Vacuum Opens West Coast Office

REDWOOD CITY, CALIF. — Veeco Vacuum Corp., a designer and manufacturer of leak detection and high vacuum equipment, has announced the opening of a new office to service Western industry.

First of the company's Western offices has been opened in 2701 Spring St., here, and plans are already set for establishing new offices as required.

Veeco is currently building a new 84,000-sq.-ft. manufacturing plant in Plainview, N. Y.



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Pacific Semiconductors In New Headquarters

CULVER CITY, CALIF.—Administrative offices of Pacific Semiconductors, Inc., were moved recently to a newly completed module of a \$10,000,000 Diode and Rectifier facility at 14520 Aviation Blvd., Lawndale, Calif.

The announcement was made by Dr. Harper Q. North, president of the Thompson Ramo Wooldridge subsidiary, which was founded in a Culver City barber shop in 1954. The company, with an annual sales rate of approximately \$20,000,000, makes semiconductor devices for U. S. defense and space programs.

Dr. North said PSI will retain its Culver City buildings and continue its operations with approximately 350 employees. Departments remaining here will include Research and Development, Microelectronics Engineering and the Manufacture of Diode Equipment which PSI designs and produces for its own production lines.

The new corporate headquarters at Lawndale now consists of 193,000 sq. ft. The new module adds 106,000 sq. ft. to the facility, in which 1,700 persons are employed.

New GE Electronic Tube Operation at Palo Alto

PALO ALTO, CALIF.—A new product sales planning operation for microwave tubes and devices has been formed by General Electric's Power Tube Dept. at its Microwave Laboratory, here.

Heading the West Coast operation, which is primarily involved in development and production of traveling-wave tubes, certain kinds of klystrons, and harmonic filters, is Bernard L. Pfefer. Prior to his new appointment, Pfefer was manager of product planning for the company's Light Military Electronics Dept., Utica, N. Y.

Koppers Open Alaskan Wood Treating Plant

JUNEAU, ALASKA—The Koppers Co. of Pittsburgh, Pa., is currently constructing a \$370,000 wood treating plant at Whittier for turning out pressure-treated poles, ties, piling, switch-ties and lumber.

The only industry of its kind in Alaska, the firm will use Alaska raw materials in its manufacturing process.

Move To Control Bay Area Air Pollution

SAN FRANCISCO—A major step in the control of air pollution in the San Francisco Bay Area has been undertaken by the Bay Area Air Pollution Control District with the enactment of Regulation 2 by its Board of Directors on May 4, 1960.

Aimed at controlling industrial, commercial, and institutional sources of smog, the regulation will reduce its most undesirable effects in the six counties that comprise the District: Alameda, Contra Costa, Marin, San Francisco, San Mateo, and Santa Clara. Large scale open burning is controlled under Regulation 1, which became effective in October, 1957.

All operations which put forth air contaminants from incineration, heat transfer, general combustion, and other general operations were required to register with the District by Sept. 1, 1960. Registration is mandatory under the law.

The deadline for compliance with air pollution restrictions is Jan. 1, 1961, unless the District approves an extension for those justifiable cases who will be physically unable to comply by that date.

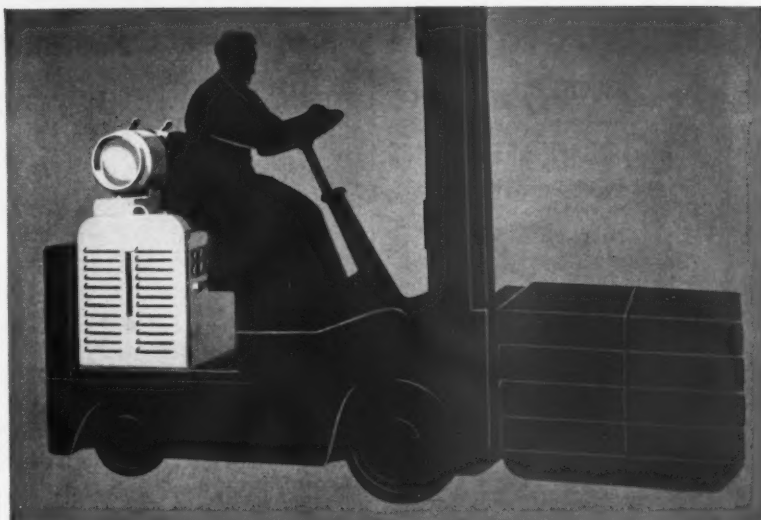
Bethlehem Improves and Expands Fastener Plant

SEATTLE—W. J. Bolton, general manager of Bethlehem Steel Co.'s industrial fastener plant here, has announced an improvement and expansion program that will place the plant in a position to serve the Northwest with cold-formed bolt products ranging up to one inch in diameter and up to six inches in length.

New equipment will be housed in a new steel-framed 100 ft. by 200 ft. building adjoining the plant's main production building at 3800 Iowa Ave. Cold making bolt and nut equipment will be relocated in the new building.

Laboratories Pool For Smog Pursuit

SAN FRANCISCO—Two West Coast members of the American Council of Independent Laboratories have become associated in air pollution investigation. They are Abbot A. Hanks, Inc., of San Francisco, of which Herbert D. Imrie is president, and Truesdail Laboratories, Inc., of Los Angeles, headed by Dr. Roger W. Truesdail.



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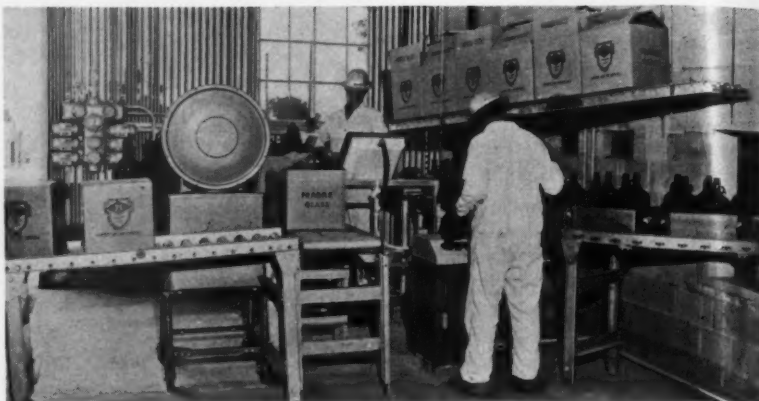


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Allied Chemical Packaging Electronic Chemicals



At the El Segundo Works of Allied Chemical's General Chemical Division, filled bottles of electronic-grade chemicals are sealed and packaged for shipment to electronics firms concentrated in the Los Angeles area.

EL SEGUNDO, CALIF.—Allied Chemical has announced completion of production and packaging facilities for the West Coast's first major source of electronic chemicals at the El Segundo Works.

Located near Los Angeles, the new facilities were installed to meet the demands of the surrounding area's large concentration of electronics firms.

A primary producer of high purity laboratory and scientific chemicals under its Baker & Adamson trade name, General Chemical Div. has developed an extensive line of ultra pure chemicals that are used for etching, as solvents, and for a broad range of applications in the production and post treatment of transistors, diodes and other semiconductor devices.

Page & Page Becomes Division of Dura Mfg.

PORTLAND—The merger of Page & Page Co., manufacturer of transportation equipment, with Dura Corp. of Detroit was announced recently by Ancel S. Page, president and general manager of the Portland company.

Page & Page will operate as a division of Dura, retaining its identity. Page will continue as general manager of the Portland division. Makers of dual-axle logging trailers, the company was established in 1937 and maintains a plant at Denver and a branch at Oakland, Calif. Dura makes automotive, agricultural, industrial and consumer products.

Degen-Fiege Co. Named Ohio Gear Company Rep

LOS ANGELES—Degen-Fiege Co., 4559 Sheila St., here, has been appointed distributor for the Ohio Gear Co. of Cleveland, maker of stock and special gears and speed reducers.

In addition to warehousing a substantial stock of gears and speed reducers, Degen-Fiege will act as local engineering consultant on special gears and speed reducers.

Hathaway Instruments Expands Denver Plant

DENVER—Hathaway Instruments, Inc., 5800 E. Jewell Ave., here, has announced a \$500,000 plant expansion program, doubling the manufacturing area of the firm which specializes in the field of electrical and electronic instrumentation, control and recording.

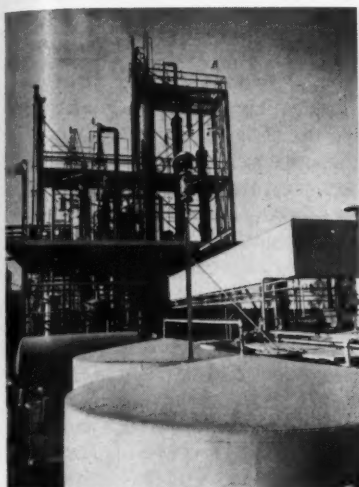
Warren D. Tilton, vice president and general manager, said construction is to be completed by Sept. 20 of the 30,000 sq. ft. of added space.

In June the firm purchased Sterling Electric Motors, Inc., of Los Angeles, for more than \$2,500,000 and last February, acquired Clemco Aero Products, Inc., Los Angeles, as a fully-owned subsidiary.

Seattle Tent & Awning Plant in Operation

SEATTLE—Roger W. Jones, president of Seattle Tent & Awning Co., has announced opening of a new plant at 708 Sixth Ave., N., for production of air houses. A product of the company's industrial division, air houses are nylon-coated fabric structures supported by air pressure.

Pacific Carbide Opens Vinyl Acetate Plant



PORTLAND—The Pacific Carbide & Alloys Co. started production at its new vinyl acetate plant in North Portland recently, marking the first Western source of this versatile chemical. The new \$500,000 plant has an initial capacity of 5,000,000 lbs. of vinyl acetate monomer annually, but is designed for expansion to 10,000,000 lbs. as the market grows.

Thomas Waters, manager, said major market outlet now is in California, but availability of a Northwest manufacturing source of supply is expected to result in industrial applications developing here.

Already four companies have expressed an interest in installing emulsifying equipment to convert the vinyl acetate monomer to polymer form, the first step in manufacturing processes to produce a wide variety of products.

Aqueous emulsions of polyvinyl acetate are used as adhesives for wood, paper, textiles, leather and metals and top interior and exterior surface coatings. Copolymers (alloys) with vinyl chloride, acrylonitrile and other monomers are used in stereo records, film, sheeting, fibers and tapes.

Solid polyvinyl acetate can be converted to polyvinyl alcohol butyral. It can be used as a film forming agent in surface coatings or a binding agent for many materials. In Japan, polyvinyl chloride is the basis for a synthetic fiber widely used in the textile industry. An American firm recently was licensed to use the Japanese process.

Its uses as adhesives and surface coatings are expected to result in a

substantial market developing in the forest products industry.

The new plant is located adjacent to Pacific Carbide's 20-year-old calcium carbide plant on N. Columbia Blvd. Basic materials are acetylene generated from the carbide, and acetic acid. A new acetylene generator with a capacity of 15,000 cubic ft. per hour has been installed to supply the vinyl acetate plant.

Acetic acid glacial, which freezes

at 60 degrees, is shipped in from Kingsport, Tenn., at the rate of a rail car per week. Arriving frozen, the material is thawed by steam pipes and pumped into special heated tanks.

Carbide is produced by electro-process from limestone and coke.

The new plant consists of a series of reaction and purification towers, blending tanks and a control room.

Cost of the plant was reduced by around \$250,000 by utilizing some of the facilities of the existing carbide plant, including utilities, offices, and laboratory.

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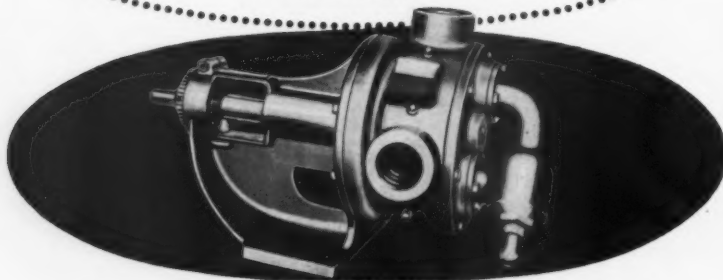
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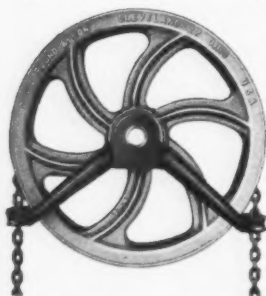
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**Fuller Company's Sales
 Office Moved to Compton**

COMPTON, CALIF.—Relocation of Fuller Co.'s Los Angeles sales office, from the downtown area to its modern plant here, was announced recently. According to J. G. Dougherty Fuller's Los Angeles district manager, the move was made to centralize Fuller's activities in the greater Los Angeles area.

The new offices are at 2966 E. Victoria St., here, where Fuller, a subsidiary of General American Transportation Corp., maintains light metal fabrication facilities and a stock of repair parts for its pneumatic handling and component equipment.

A complete line of products of Sutorbilt Corp., a subsidiary of Fuller, is also made at the plant. This includes lobe-type positive displacement blowers, vacuum pumps and vapor compressors.

**Dow Awards Job to
 Puget Sound Firm**

SEATTLE — Gordon Anderson, president of Puget Sound Fabricators, Inc., has announced that his firm is building a series of stainless steel reactors, columns and process tanks for a new plant being erected by Dow Chemical Co. of Canada near Vancouver, B. C. The order is valued at about \$300,000.

Dow is building a plant on Tilbury Island in the Fraser River between Westminster. The initial program calls for expenditures of between \$3,000,000 and \$4,000,000. The complete facility, when expanded, will represent a \$20,000,00 investment.

**Anadite Reports 300% Boost
 In Color Anodizing Activity**

SOUTH GATE, CALIF.—Anadite Inc., chemical milling and metal finishing firm, has been awarded two color anodizing contracts, one involving exterior aluminum panels for the new Los Angeles International Airport and another for exterior trim at the Air Force Academy, Colorado Springs, Colo.

Contracts are estimated at more than \$200,000 and represent an increase of 300% over last year for the Anadite architectural division.

In line with this increase, a major expansion is underway at the Anadite South Gate facility.

GM Purchases Western Facility For Research

GOLITA, CALIF. — Purchase of a new West Coast research facility for the General Motors Defense Systems Div. was announced recently by *Harold R. Boyer*, GM vice president and general manager of the division at Detroit.

The property and buildings, located here in Santa Barbara County, were purchased by GM from Curtiss-Wright Corp., which built the facility over the last three years as a research unit.

Consisting of four buildings, totaling 210,000 sq. ft. on a plot of some 104 acres, the new lab is adjacent to the Santa Barbara Municipal Airport and is one mile from the Pacific Ocean.

"Its proximity to the ocean was an important factor in our decision to purchase the property, because it is planned that extensive research will be carried on at this center in underwater instrumentation," Boyer said.

Dow Halts Operations Of Sequoia Metalcraft

SAN CARLOS, CALIF. — The Dow Chemical Co. has announced discontinuing operations of Sequoia Metalcraft Co., Inc., a magnesium foundry here.

The firm, which has 47 employees, has been operating as a wholly-owned subsidiary of Dow. The capital stock of Sequoia Metalcraft was purchased by Dow in November, 1959.

"Because of the very low volume of business available for Sequoia, we have found it necessary to discontinue operations," said *Hubert Fruehauf*, president of Dow Metal Products Co. Div. of Dow. Fruehauf also served as president of Sequoia Metalcraft.

Fruehauf also said that a Dow personnel representative from the Western Div. at Pittsburg, Calif., will assist terminated personnel in the location of new jobs.

Bleach Plant Expansion Slated at Cosmopolis

ABERDEEN, WASH. — The building of a \$1,000,000 addition to the bleach plant at Weyerhaeuser Co.'s Grays Harbor branch pulp mill in Cosmopolis has been announced by mill manager, *Merrill Robison*.

The expansion will add to the mill's flexibility, according to Robison, who reports the construction is due to be completed in eight months.

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Another Expansion For John Fluke Mfg. Co.

SEATTLE—The John Fluke Mfg. Co. will expand plant facilities for the fifth time within the past eight years, according to John Fluke, president of the local firm.

Addition of 19,000 sq. ft. will more than double the area of the recently completed electronics plant north of Seattle. The present plant was completed in November, 1959. The new units will be completed in October.

Colorado Firm Buys Kenai, Alaska Leases

ANCHORAGE—Hawk Exploration Co., a Colorado corporation, has announced the exercising of an option with the Anchorage Gas and Development, Inc., to buy a substantial interest in about 48,000 of the company's oil and gas leases in the Kenai-Cook inlet basin.

The firm has also leased the drill rigs, machine shops and camp facilities on the present drilling site.

Boeing Dedicates New Basic Research Center

SEATTLE—About 200 representatives of science, industry, government and education attended a recent dedication of the Boeing Airplane Co.'s new \$2,250,000 basic research center here.

The new center will house scientists doing research in mathematics, flight sciences, plasma physics, solid-state physics and geo-astronomy.

The plant is located across the Duwamish River from Boeing plant 2.

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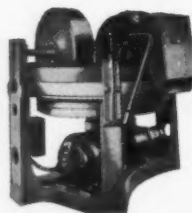
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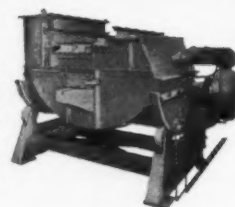
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WESTERN INDUSTRY/SEPTEMBER 1960

Leach Corp. Acquires Facility in Azusa

LOS ANGELES — Additional manufacturing facilities have been acquired by the Leach Corp. through the acquisition of the new plant formerly occupied by U. S. Relay Co., in Azusa, Calif.

The announcement was made by K. F. Julin, Leach president, who said the plant will be operated as the Azusa facility of the Leach Corp., with W. D. Sellers as operating manager.

U. S. Relay was recently liquidated. The plant, a two-story building of 48,000 sq. ft., incorporates the most modern technologies in design and production. It was built two years ago.

Julin said that Leach plans for the facility are now in the process of being formalized.

Coyne Cylinder Company In Consolidation Move

SOUTH SAN FRANCISCO — John P. Coyne, president of Coyne Cylinder Co., 224 Ryan Way, here, has announced the consolidation by exchange of stock with American Cryogenics, Inc., of Acetylene Cylinder Corp., Farwest Equipment Corp. and Coyne Cylinder Co., all of San Francisco, and the Sierra Oxygen Company of Reno; also the acquisition of McKesson Appliance Co. of Toledo, Ohio, for cash in excess of \$1,000,000.

Coyne's cylinder manufacturing and distributing activities and McKesson's medical therapy equipment will further integrate the operations of American Cryogenics, owners of Marks Oxygen Co. in Augusta, Ga., already engaged in the production and distribution of liquid oxygen, nitrogen, argon, gaseous oxygen and acetylene gas and in the distribution of gas equipment.

Tektronix Expanding Warehouse Facilities

BEAVERTON, ORE. — Construction of a 70,000 sq. ft. extension to the Tektronix Inc. warehouse at 455 N. W. Hocken St., near here, is underway.

The addition, costing \$270,000, will provide 50,000 sq. ft. of warehouse storage area for purchased and manufactured materials. The remaining 20,000 sq. ft. will be used for work space.

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Donner



H. Diehm, Jr.
Puget Sound
Fabricators



J. C. Elms
Ford
Aeronutronic



J. W. Noland
Young Spring
& Wire

■ **William G. Landry** has been named manager Corona, Calif., plant, Johns-Manville Fiber Glass Div.

■ **Julian Fotre, Jr.**, has been appointed manager Northern California operations of Kilsby-Tubesupply, San Francisco.

■ **Robert A. Upson** has been named district manager of Stanley Electric Tools, div. of Stanley Works, covering western Montana, southern Idaho, Oregon and southwestern Washington.

■ **Syd M. Lewis** is new Building Materials Div. sales manager, Pioneer Div., Flintkote Co., Los Angeles.

■ **Richard D. Hanson** has been elected vice president of Donner Scientific Co., Concord, Calif.

■ **Harry Diehm, Jr.**, is newly named sales manager of Puget Sound Fabricators, Inc., Seattle, for the Northwest and Alaska.

■ **James C. Elms** has joined Aeronutronic Div., Ford Motor Co., as general operations manager, Electronic Systems Operations, Newport Beach, Calif.

■ **James W. Noland** is newly appointed general manager Gonset Div., Young Spring & Wire Corp., Burbank, Calif.

■ **John W. Hurtt** has been named superintendent of maintenance at Anchorage for Alaska Airlines.

■ **Roland Louis Guerin, Jr.**, has been named sales manager, BMW Mfg. Co., Inc., Torrance, Calif.

■ **Frank A. Mondok** has been appointed vice pres. and **C. N. Hollwedel**, senior project engineer, Turbo-craft, Inc., Pasadena, Calif.

■ **Carlos Sharpes** is newly appointed director of quality assurance, National Astro Laboratories, Pasadena, Calif.

■ **A. I. Eddy** has been named sales manager Pacific Div., Pennsylvania Flexible Metallic Tubing Co., Los Angeles.

■ **Gordon C. Godejahn** has been appointed manager, Los Angeles branch, Central Scientific Co., replacing **Gordon H. Baker**, promoted to Chicago.

■ **Virgil W. Wall** is new director of engineering, Electronic Systems div., Telecomputing Corp., No. Hollywood.

■ **E. C. Titcomb** is newly appointed manager, customer relations, Computer Equipment Corp., Los Angeles.

■ **Thomas A. Bruce** is new assistant Western regional manager, Industrial Div., Corn Products Sales Co.

■ **Dr. W. M. Hearon** has been elected vice-pres., research and development, Crown Zellerbach Corp., San Francisco.

■ **W. K. MacCready**, general manager, GE's Chemical Processing Dept., Hanford, Wash., retires Nov. 1 after 25 years in industry, to pursue cattle ranching.

■ **William L. Keady**, 67-year-old president, Fibreboard Paper Products Corp., San Francisco, is resigning as president but will continue to handle firm's foreign operations.

■ **Austin S. Daynes** has joined the industrial sales staff of Rinshed-Mason Co., Anaheim, Calif.

■ **Robert D. Burnham** is newly appointed manager, small transformer div., Electro Engineering Works, San Leandro, Calif.

■ **James R. Bachman** has been appointed manager, basic refractories lab, Kaiser Refractories & Chemical Div., Milpitas, Calif.

■ **Dr. Yusuf A. Yoler** has been assigned the job of Dyna Soar staff engineer, Boeing at Seattle.

■ **W. M. Carney** has been appointed executive vice pres. and general manager of operations, Western Aggregates, Everett, Wash.



E. S. Dulin
Byron Jackson



A. J. Baggenstos
General Appraisal



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Rapistan



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Denver Equip.



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ESCO



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Northrop



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Cannon Elec.



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Rectifier

■ **E. S. Dulin**, chairman of the board of Byron Jackson, Los Angeles, retired Sept. 1 after 31 years of leadership.

■ **Arthur J. Baggenstos** has been named district manager of San Francisco office, General Appraisal Co., and vice pres. of General Appraisal Co. of Calif. He succeeds **W. D. Trewartha**, who passed away recently.

■ **Edward P. Russell** has joined Rapistan of Calif., Inc., as sales engineer for new Los Angeles Division.

■ **James E. Quinn** has been appointed general sales manager, the Denver Equipment Co. at Denver.

■ **Nello J. Vanelli** has been named assistant to vice pres., export, Electric Steel Foundry Co., Portland.

■ **Lee H. Smith** has been named director, Ground Environment and Sub-Contracts Marketing Section, Northrop Corp.'s Norair Div., Hawthorne, Calif.

■ **Floyd M. Cate** has been appointed vice pres., sales, Cannon Electric Co., Los Angeles.

■ **Eli Mitchell** has been appointed Western regional sales manager, International Rectifier Corp., El Segundo, Calif.

■ **James B. Arbios** has been named general sales manager and **Charles McKeever** manager of production, Multiwall Bag Div., Ames Harris Neville Co., Berkeley, Calif.

■ **Frank Lipari** has been appointed manager of J. I. Case Co.'s Stockton, Calif., plant.

■ **John H. Humphrey** has been named vice pres. of management engineering and planning, Dashew Business Machines, Inc., Los Angeles.

■ **Earl J. Shelton** is manager of a newly formed high-power tube div. at Eitel-McCullough, Inc., San Carlos, Calif.

■ **Alexander Black**, Western area manager of sales, Canco Div., American Can Co., San Francisco, has been promoted to manager, marketing div. at New York.

■ **W. H. Klarquist** has been appointed general manager, purchasing, Standard Oil of Calif., San Francisco.

■ **Dr. Jack S. Anderson** has been named director engineering, Systems and Control Group of Crane Co., Burbank, Calif.

■ **Harold E. Nee** has been promoted to general manager of the Ukiah, Calif., plant of Masonite Corp.

■ **Harry E. Baker** has been named senior Ordnance representative in charge of Army Ordnance Corps' Inspection Office at Seattle.

■ **Kenneth DeBaun** has been placed in charge of Farr Co.'s new San Francisco office as district sales manager.

■ **Donald J. Sauser** has been named engineering manager, technical sales and service, Cherry Rivet Div., Townsend Co., Santa Ana, Calif.

■ **Donald E. Graham** has been named president of Smith Tool Co., Los Angeles, replacing **H. C. Smith**, who will continue as board chairman.

■ **Dermont N. Macconel**, president of Machinery Sales Co., Los Angeles, passed away last month.

■ **Dr. Vladimir Vodicka** has been named manager, newly formed Advanced Development Group, Lenkurt Electric Co., San Carlos, Calif.

■ **Don Fullerton** has been appointed district sales manager, Harvey Aluminum, Portland.

■ **Charles K. Watters** has been named to head new St. Regis Paper Co. multiwall bag sales offices, Phoenix.

■ **Kenneth A. Sheppard** has been named vice pres. in charge Alaska operations, Alaska Pipeline Co., Anchorage.

■ **E. M. Proctor**, manager production Western operations, Bemis Bros. Bag Co., has been promoted to ass't. director production, St. Louis general office.

■ **R. L. Hanes** has been named general manager Tubular Sales, Colorado Fuel & Iron Corp., Denver.

■ **Paul T. Persons** has joined Stauffer-Temesco Co. as assistant general manager, Richmond, Calif.

■ **Oliver Lipscomb** has been promoted to manager, purchasing, Continental Airlines, Los Angeles.

■ **Donald R. Smith** has been named manager, distributor sales, Motorola Semiconductor Products Inc., Phoenix.

■ **Thomas K. Breitfuss** has been appointed manager of pipe operations, Graystone Inc., Seattle.

Contract News for the West

LOS ANGELES — Over \$9,500,000 in Army Ordnance contract awards was announced for the three weeks ending August 5 by the U. S. Army Ordnance District at 55 Grand Ave., Pasadena. Contracts awarded include:

Sperry Utah Engineering Laboratory, Salt Lake City, \$95,369 for Sergeant missile equipment and repair parts; and \$1,508,622 for Sergeant missile system training material and publications.

Norris-Thermador Corp., Vernon, Calif., \$1,457,589 for cartridge cases.

Aerojet-General Corp., Downey, Calif., classified, \$285,031; research and development, \$443,971 for rotor assembly machines and \$242,258 for cartridges. *Aerojet-General*, Azusa, Calif., research and development, \$249,521 for airborne instrumentation; \$113,408 for study of stress-corrosion cracking of high strength alloys; \$39,996 for in-organic resin and elastomers; and \$31,201 for generator modulator.

Nortronics, Div. of Northrop Corp., Anaheim, Calif., \$759,398 for Hawk missile repair parts; \$298,699 for engineering services; and \$32,915 for automatic check-out equipment.

Harvey Aluminum, Torrance, Calif., \$695,449 for cartridge cases, piston assemblies and ammunition components, and \$126,722, research and development for rifle mount and breech. *Eidal Mfg. Co., Inc.*, Albuquerque, N. M., \$680,889 for trailer chassis.

Convair, Div. of General Dynamics Corp., San Diego, \$646,000 for research on re-entry radar.

Cubic Corp., San Diego, \$204,953, research and development for electronic trajectory measuring system.

Hughes Tool Co., Aircraft Div., Culver City, Calif., \$200,000 for development of refractory composite material systems.

Hughes Research Laboratories, Div. of Hughes Aircraft Co., Malibu, Calif., \$199,805 for research and development of rocket liner material.

Rocket Power/Talco, Div. of Gabriel Co., Pasadena, Calif., \$172,698 for catapaults.

Consolidated Western Steel, U. S. Steel Corp., Los Angeles, \$159,582 for motor case assemblies.

Douglas Aircraft Co., Inc., Santa Monica, Calif., \$158,933 for Nike

Hercules missile launching area items and adaption kits.

Ling Electronics, Div. Ling-Altee Electronics Inc., Anaheim, Calif., \$146,755 for vibration testing system.

North American Aviation, Inc., Rocketdyne Div., Canoga Park, Calif., \$80,241 classified contract. *Autonetics Div.*, Downey, \$57,830 for a digital computer.

Thompson Ramo-Wooldridge, Inc., Canoga Park, \$124,837 for telemetering systems.

Associated Aero Science Labs, Hawthorne, Calif., \$90,193 for civilian technical assistance at Redstone Arsenal, Ala.

Information Systems, Inc., Los Angeles, \$71,805 for a magnetic-optic converter.

Preshaw & Thompson, Inc., Van Nuys, Calif., \$70,771 for baroswitch test sets.

University of Southern Calif., Los Angeles, \$61,000 for basic research in radiation.

Motorola, Inc., Scottsdale, Ariz., \$40,242 for radar beacons.

Radioplane, Div. of Northrop Corp., Van Nuys, \$33,785 for target missile flight test program.

University of Calif., Berkeley, \$33,650 for operation of electrical-mechanical standards lab.

Firestone Tire & Rubber Co., Los Angeles, \$32,436 for Corporal missile repair parts.

The San Francisco Office of the Atomic Energy Comm. on August 10 let three contracts valued at more than \$3,800,000 to *General Electric's* Atomic Power Equipment Dept. for irradiation, testing and investigation of nuclear fuel and control rod materials.

Follow-on contracts reported to WESTERN INDUSTRY included: *Siegler Corp.*, Hallamore Electronics Div., Los Angeles, \$525,000 from Martin Co., Denver; *Summers Gyroscope Co.*, Santa Monica, \$400,000; *Telecomputing Corp.*, Narmco Mfg. Div., La Mesa, Calif., \$350,000; *Consolidated Vacuum Corp.*, Pasadena, \$160,000; *Kinetics Corp.*, Solano Beach, Calif., \$60,000.

The U. S. Air Force awarded *Northrop Corp.*, Hawthorne, \$950,000 research contract in low drag boundary layer control; *Burton Mfg. Co.*,

Santa Monica, \$280,000 for instrumentation; *Garrett Corp. AiResearch Mfg. Co.*, Los Angeles, \$235,000 for development of a test space capsule; and *Ford Motor Co.*, Aeronautics Div., Newport Beach, \$97,543 for a high speed scanning device.

Telecomputing Corp., Los Angeles, also was awarded \$1,700,000 from Bureau of Naval Weapons for airborne radar systems and \$900,000 from Naval Research Lab for a Tetrac antenna. The Naval Bureau of Weapons also awarded *Ford Motor*, Aeronutronic Div., \$175,000 for an under-sea warfare device. The U. S. Navy's Military Sea Transportation Service awarded a \$130,000 contract to Hallamore Electronics Div., *Siegler Corp.*, Los Angeles. *Crescent Engineering and Research Co.*, El Monte, Calif., was awarded \$170,000.

CLASSIFIED SECTION

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For Sale

Fostoria Ovens (3 pairs)

48 inches high
18 1/2 feet long over all, divided into six different units
Two pairs 88 1/2 inches long each
One pair 44 inches long.
These ovens are practically new and will sell at sacrifice of half price. Can be seen in operation in our plant at Fresno, California.

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Roscoe McKenry, General Manager

Lit-Ning Products Company

P. O. Box 3287, Fresno, California



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personalize your volume mailings!

The impact of a personal typewritten letter is well known, but heretofore these letters in large quantities have been impractical to produce. Now MAILWAYS INC. through use of tape, can volume process your letters ... effectively and economically.

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Easterday Supply Moves Into Expanded Quarters

SAN FRANCISCO—Easterday Supply Co., West Coast distributors of sanitary supplies, has moved into expanded quarters at 333 Fell St., here, according to *Ted Rosenberg*, president.

The new facilities provide 3,200 sq. ft. of additional office space and 3,500 sq. ft. of additional warehouse space. This is the final stage of a rehousing program for the principal Easterday offices. The Los Angeles office moved to larger quarters in 1958 and the Portland office in 1959.

New Chemical Treatment Strengthens Wool Felts

ALBANY, CALIF.—A chemical treatment that shrinks wool fibers may be the basis for improved manufacture of wool felts, according to the U.S. Dept. of Agriculture.

USDA scientists have found that soft wool felt treated with a hot solution of dimethyl sulfoxide becomes dense and hard within a few minutes.

Relative hardness of the felt can be controlled both by the length of time the felt is left in the solution and by the temperature of the bath. Splitting tests indicate that the treated felts are two to three times stronger than the original felts.

Insulation Board Plant in Production

PASCO, WASH.—The American Stramit Co., latest firm to locate in Big Pasco, plans to be in production by mid-September, according to *Fred Duncan*, plant engineer.

The firm, which makes structural insulation board from highly compressed straw, has from 5,000 to 6,000 tons of wheat straw already pledged by area farmers and is still seeking more.

The insulation board is made entirely of clean wheat straw for both interior and exterior use. The straw is fed into a machine which compacts it and applies heat at a temperature of 480 degrees to bring out the natural resins. The compacted straw board is then conveyed to a cutting saw, and is finally covered by a thick ivory paper or tarpaper, depending on specifications from the architect.

Food Wholesalers Expand Warehouse

FRESNO, CALIF.—The Buy-Rite Wholesale Distributing Co., here, tripled its warehouse space to 40,000 sq. ft. when it moved to 302 North Thorne recently. *Jack Helm*, president and general manager, said the new plant cost \$200,000. Buy-Rite is an institutional food wholesaler.

CONTROL PAINT OVERSPRAY the inexpensive, effective way!

The advantages of R P Paint Arrestors, the inexpensive, disposable air filters are many. Overspray solids are trapped before they reach the exhaust stack... to reduce fire hazards, damage to adjacent property... disagreeable and time-consuming maintenance work. Installation? —easy and fast. Maintenance? —remove loaded Paint Arrestor and replace a new one. Adaptability? —ideal for any type, any size booth, new or existing.

RP PAINT ARRESTORS

Products of Research

RESEARCH PRODUCTS Corporation

DEPT. 312-1, MADISON 1, WISCONSIN

IN THE WEST

NORMAN S. WRIGHT & CO.

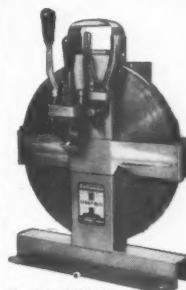
1015 E. FOLSOM, SAN FRANCISCO (UN 3-3321)
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WESTERN INDUSTRY/SEPTEMBER 1960

NEW PRODUCTS



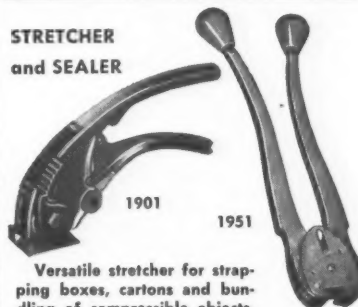
Model 00-140

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COMBINATION STRAPPING UNIT

A money-saving strapping "package" including stretcher cutter and dispenser—at a low cost package price, is now available. Write: A. J. Gerrard, 14388 Washington Street, San Leandro, California.

STRETCHER and SEALER

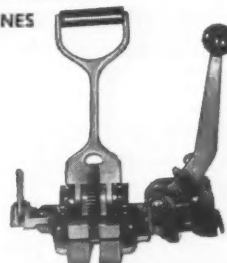


Versatile stretcher for strapping boxes, cartons and bundling of compressible objects. Also, easy to operate sealer for use with 3/4" strapbinder seals. Write: A. J. Gerrard, 14388 Washington Street, San Leandro, California.

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OVAL STRAPPING MACHINES

Models 2820 and 2840



Are available in several sizes and styles to meet practically every industrial requirement. Write: A. J. Gerrard, 14388 Washington Street, San Leandro, California.

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STRAP AND WIRE CUTTER



Model 503

Dual purpose cutter—cuts oval strapping up to 3/4" wide flat strap, as well as 14 gauge and finer round wire. A valuable tool that pays-for-itself in any receiving or shipping department. Write: A. J. Gerrard, 14388 Washington Street, San Leandro, California.

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Practical, Down-to-Earth Welding Rod—
Alloys as they are supposed to be

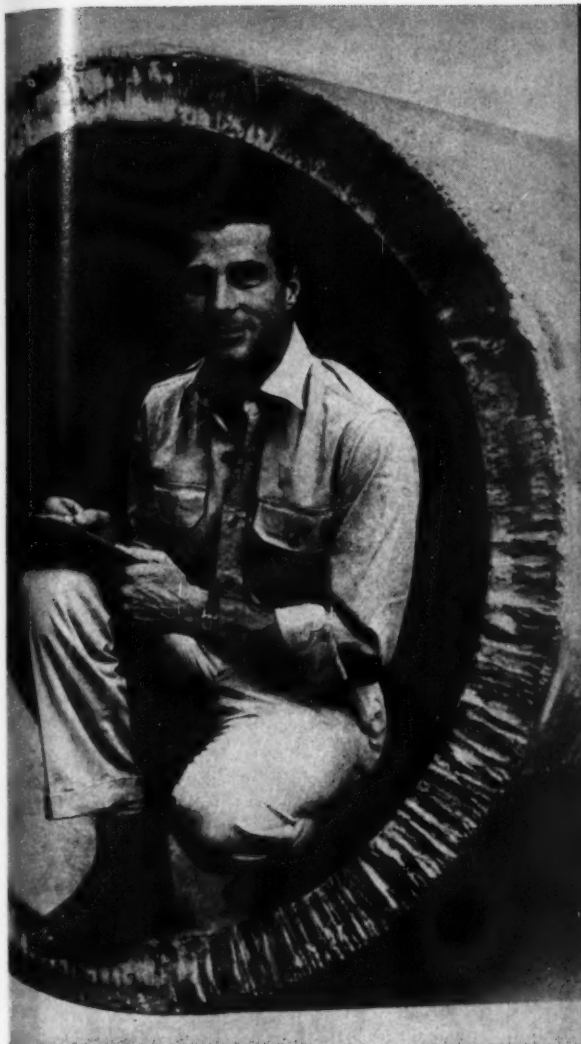
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Clean metal

Strong—
Low in cracking

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Regardless of the "size" of your tubing problem, Ducommun can help you handle it! Whether you need large centrifugally cast steel tubing with a 50" O.D.—or tiny .012" O.D. stainless steel tubing—it's available from Ducommun.

Between these extremes, Ducommun offers a full range in the size, material, shape and wall thickness to meet your specific application. If you use tubing—call in a Ducommun Tubing Specialist!

CARBON SEAMLESS STEEL TUBING—Round, Square, Cold Drawn and Hot Finished.

CARBON WELDED STEEL TUBING—Round, Square and Rectangular Hydraulic Tube, "Espro" Hot Rolled Structural Tube and Boiler Tubes.

CARBON STEEL PIPE—Seamless and Welded.

"ACIPCO" CENTRIFUGALLY CAST TUBES—Made in carbon, alloy and stainless grades.

SEAMLESS COPPER TUBE, PIPE AND WATER TUBING—Hard and soft temper.

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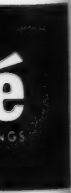
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